

THE
NORTHERN FARMER:

OR
SELECT ESSAYS
ON
AGRICULTURE;

ADAPTED

To the SOIL and CLIMATE

OF THE

NORTHERN COUNTIES

OF

ENGLAND, SCOTLAND, AND IRELAND.

VOLUME II.

——— Laudato ingentia rura;
Exiguum colito. VIRGIL.

Venio nunc ad voluptates agricolarum, quibus ego incredibiliter de-
lector; quæ nec ulla impediuntur senectute, et mihi ad sapientis
vitam proxime videntur accedere. CICERO.

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NORTHERN MARITIME

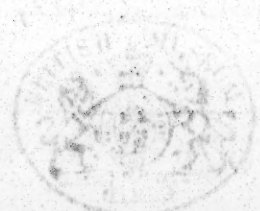
OF THE NORTH ATLANTIC

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THE
SCOTS FARMER,

NOVEMBER 1773.

ARTICLE I.

Of some general things to be attended to in the management of a farm—Of the Climate—Of the Soil—Of the common practice of the country—Of the preceeding management of the farm—Of Oeconomy.

[Dickson's Agriculture, Vol. II.]

VIRGIL wisely recommends to the husbandman, carefully to attend to the climate, the winds, the practice of his forefathers, the particular method prosecuted in the preceeding management of his farm, and the plants for the nourishment of which his soil is best adapted *.

A scheme of husbandry, in which little attention is given to the climate, though the very best in appearance, must, however, be unsuccessful in practice.

The climate determines the times of plowing and sowing ; it directs our choice in the kind of plants to be cultivated ; it regulates the whole œconomy of the farm, and informs the husbandman how to appoint the order of the different kinds of labour necessary, so as he may be always usefully employed.

Vol. II. N^o I.

A

The

* At prius ignotum ferro quam scindimus æquor,
Ventos, et varium cœli prædiscere morem
Cura sit, ac patrios cultusque habitusque locorum,
Et quid quæque ferat regio, et quod quæque recusæt.
Hic segetes, &c.

Geo. 1. lib. 50. ver. &c.

The knowledge of the particular method observed in the preceeding management of a farm is not of small importance. If it has been successful, it ought not to be rashly or suddenly changed. If it has proved unsuccessful, the cause should be inquired into; and if this is found out, the farmer will receive instruction from the errors of his predecessors.

The knowledge of the common practice of the country; or of our forefathers, though not so important as the knowledge of the other two things mentioned, is, however, not to be despised. We should not only know the established customs, but should likewise endeavour to trace out their causes. There is scarcely a custom that prevails in any country, however absurd it may appear in the eyes of some persons, but is founded upon some good reason, and probably, at the time when it was established, was a real improvement. The knowledge, therefore, of these customs, and of their original design, must be advantageous. This, at least, may enable the farmer to avoid mistakes in changing them in his practice. An enquiry into these things necessary to be attended to in the management of a farm, is the subject of this treatise.

Of the Climate.

Nothing has more effectually retarded the progress of agriculture, than the attempts that have been made to introduce general schemes, without any regard to the climate. A lover of agriculture, captivated by a scheme of husbandry which he has observed in Flanders, or in some of the southern counties of England, without any proper preparation, attempts to put this scheme in practice in one of the shires of Scotland, notwithstanding the great difference of climate. This attempt proves unsuccessful, as it is natural to expect, where circumstances are so different, and the natural aversion of the farmers to change their ordinary practices is thereby rivetted in them †.

The

† Custom is very powerful: The things which, in our younger years we have been taught to regard, continue to make an impression upon us, and

We may consider it as a thing certain, that the scheme of management prosecuted in every country is in some measure adapted to the climate; for this is a thing to which experience would naturally lead the most inattentive. A few trials would determine what plants should be cultivated, at what seasons the land should be plowed, and the seed sown; and therefore, without a knowledge of the climate, no proper change can be made in the ordinary schemes of management, no new scheme proper for the country can be formed, nor improvement made. Columella represents the knowledge of this as of very great importance. For, says he, whoever would be perfect in this science, (agriculture) must be well acquainted with the nature of things, and must not be ignorant of the various climes, that he may know what is proper for every country: He must know perfectly the rising and setting of the stars, by which the various seasons are regulated, that he may not be attacked by winds or rains in the beginning of his operations, and thereby his labours be frustrated *.

The and we cannot be persuaded to change our opinion of them without very good reason. This influence that education has upon mankind, is, of all others, perhaps the greatest blessing to society, and therefore none but such as are enemies to society, attempt to ridicule a thing so natural and beneficial. The gentleman and farmer appear in a very different light with respect to old customs in agriculture. The gentleman despises them; the farmer, on the contrary, is attached to them: The reason of this difference is not always attended to, though very obvious. The farmer has been educated in the knowledge of these customs, and he has been taught from his infancy to consider them as the best. The gentleman has been taught nothing about them, and he is naturally led to disregard the opinions of those whom he considers as far inferior to him in all kinds of knowledge. Were the farmers more liable to change, improvements indeed would be more easily introduced; but as good and bad schemes have often the same appearance, and can be distinguished only by being reduced to practice, in this case rents would be worse paid, and more frequent bankruptcies among the farmers. I mention this, because I would not have it thought that I impute to an unreasonable obstinacy, the aversion which the ordinary farmers have to change the customs in which they have been educated. vid. vol. I. p. 7.

* Nam qui se in hac scientia perfectum volet profiteri, sit oportet rerum naturae sagacissimus, declinationis mundi non ignarus; ut exploratum habeat,

The following things in the climate ought to be attended to.

The degree of heat and cold, and the time when these begin and end.

The quantity of rain that falls, the nature of the showers, and the season of the rain.

The keeping a register of the weather in different places with the help of proper instruments, would certainly be very beneficial in many respects, and particularly would tend much to the improvement of agriculture. Such a knowledge as might be acquired from this, is not to be expected in the farmer. However, from that attention to the weather, which every man is capable of, he may attain a knowledge that may be very useful to him, may find out the causes of the established customs, and thereby have it in his power to improve them.

It is by a proper knowledge of the climate, that the farmer can determine what kind of plants he ought to cultivate, and can regulate the proper seasons for plowing and sowing. The customs of the country have in some measure established these things. But as these customs have been themselves established as agreeable to the climate, the more that the farmer acquaints himself with it, the more capable he is to improve these customs, to introduce with success the culture of new plants, and make alterations in the ordinary seasons of plowing and sowing. No person is so foolish as to imagine, that all kinds of plants can be cultivated with equal success in all climates: it is even vain to imagine, that they can be cultivated with equal success in all parts of this island, or in all places in the same latitude. A very small distance sometimes makes a very great difference in climate, in the degrees of heat and cold, and in the quantity of rain that falls. It is well known, that the climate is much colder upon the higher than upon the lower ground, and that much more rain falls in the
West

habeat, quid cuique plagae conveniat, quid repugnet: Siderum ortus et occasus memoria repetat, ne imbris ventisque imminentibus opera inchoet, laboremque frustretur. COL. de Re Rustica, lib. 1. praef.

West of Scotland than in the East: Plants therefore which may be cultivated, and schemes of management which may be carried on with success, in one place, may be very unsuccessful in another.

Every husbandman knows, that there is a particular season in which every kind of grain must be sown, that it may not be destroyed by the cold, and may have sufficient heat to ripen it. He knows also, that his crop depends much upon the nature of the seed-time, and upon the situation of the land when it is sown and harrowed. He knows likewise, that to make land receive all the benefit of plowing, it ought to be in a proper situation when this operation is performed; and that when it is plowed in such a situation, it is much more secure against all injuries from the weather, than when it is plowed in a different situation, or is allowed to ly unplowed. These things make a particular attention to the climate of the greatest importance; and the farmer, who is attentive to this, who adapts the plants which he cultivates to it, who is always ready to catch the favourable season as soon as it appears, and who is always careful, while he has opportunity, to put his land into such a situation as to receive the greatest benefit from the heat and frost, and to be best fortified against the cold and rain, this farmer, whatever is the scheme of management which he prosecutes, will be successful; while the one that prosecutes any other scheme, though the best in appearance, that is not adapted to the various changes of the climate, will meet with nothing but disappointments.

Of the Soil.

In our first Volume, soil has been considered both with respect to the tillage that ought to be given, and the manures that should be applied. In this place, it is to be considered, with respect to the general scheme of management, as one of the things that ought principally to be attended to.

Plants

Plants should be adapted to soils as well as climates, so likewise should the times of plowing and sowing. In fields lying contiguously to each other, we find soils very different : We even find this very often in the same field. This difference should be attended to, and the fields divided in such a manner, that each field may be as nearly of the same soil as can be done conveniently. When fields are divided in this manner, plants can be more easily adapted to them, and the times of plowing and sowing more easily regulated. Every intelligent farmer knows, that, according to the nature of the soil, as it is deep or shallow, stiff or light, wet or dry, different seasons and different kinds of plowing are necessary. He knows likewise, from undoubted experience and observations, that particular plants are adapted to particular soils. For example, that wheat is the most certain crop upon some fields, and barley or oats upon others. In the ordinary schemes of management, there is a succession of different kinds of grain upon the same field, and it is observed, that almost every field has its favourite grain, and that when this grain is sown, the crop is of all others the most certain. But at the same time, when this favourite grain is too frequently repeated, it is observed, that the crop becomes worse than it would have been if another kind of grain had been sown. This makes it necessary to attend in a particular manner to the soil, that so we may know how to indulge it in its favourite grain, and of the various schemes of agriculture, prosecuted in the country, we may know to choose the one best adapted to it.

Of the common practice of the Country.

With some persons it is a necessary quality in an improver to despise the common practice of the country, to consider the ordinary farmers, as cattle that know not how to leave the tract in which their forefathers have moved before them, and to approve most of that scheme of management that is

most uncommon. It is not necessary to do more than mention these sentiments to show their absurdity. That the general schemes of agriculture in Scotland need much to be improved, is indeed a thing most certain; but it is as certain, that the despising these schemes, and acting upon plans entirely new, is not the proper way to introduce the real improvement that is so much wanted.

In the general schemes of management practised in the country, we find seasons for plowing, and ways of plowing for particular purposes; different culture given to different crops; and rules observed in the succession of crops, in fallowing and manuring: It is improper to assert that these customs have been established by accident; and unless a person hath examined them with great accuracy, and can clearly demonstrate that they are bad, he ought to acknowledge at least, that it is possible they may have arisen from experience. It is a certain thing, that the general practice in some shires in Scotland is different, in many respects, from what it was an hundred years ago; and it is possible, that the practice an hundred years ago, was as different from the practice in the century preceeding. The attachment of the farmers therefore to their established customs should convince us, that every general practice in a country was either necessary, or a real improvement when it was introduced; and consequently, that to reverse this practice entirely, is to try a dangerous experiment. Could we carry the soil and the climate along with the schemes which we bring from the south, it shall be allowed, that we might, without the smallest hesitation, reverse the best established scheme in Scotland: Had we these at command, we might adapt them to our favourite scheme, but, as this is impossible, it becomes absolutely necessary to adapt our schemes to them; without which, as I have endeavoured to show, we cannot be successful. Experience alone can enable us to do this, and, without experience, which cannot be got in a few years, no person should, in objects very important, entirely reverse

reverse those practices which, from their being general, we have reason to believe have been established by long experience, as agreeable to the soil and climate. To show what reason there is for this caution, I shall mention a thing, which, as it has frequently happened, must have fallen under the observation of many. Farmers who have endeavoured to introduce into one part of the country the practices of another part, where the climate and soil are different, have, for the most part, been unsuccessful: This makes it probable, that there is something in the climate or situation of the soil, to which every general practice is adapted, and therefore, if, instead of this, another opposite practice is introduced, though it may be founded upon the best theory of vegetation and tillage, yet, not being adapted to the climate and soil, will not prove successful. For this reason every farmer should be cautious in reversing established customs, and careful to enquire into the reasons that may have introduced them, as this will enable him to introduce new methods of culture with less danger, and more effectually to improve the old.

Upon this plan, in my opinion, the lovers of agriculture should proceed. Instead of searching England and other places for new methods, for new schemes, and new instruments of husbandry, they should endeavour to understand the methods, the schemes, and the instruments we are already possessed of, to find out in what things they are deficient, and how they may be improved. Instead of attempting to introduce one or two wheeled, or two or four coulters ploughs, and complaining of the stupidity and obstinacy of the ordinary plowmen, because they cannot, or will not use them, they should study the mechanism of the common plough, learn the uses of its different parts, and consider how it may be improved and applied to the different soils. Was this plan prosecuted, I am persuaded, that agriculture would make greater progress than it does at present.

I should be sorry, if the cautions given in this and the preceding

ceeding chapters should be so far misunderstood, as to encourage any farmers in indolence, or attach them to those old customs, which now appear from experience to be ill-founded. I had in my view those places of Scotland only, where agriculture is best understood, and where remarkable changes in the schemes of management have been already introduced. These schemes are still far from being perfect, and therefore no farmer should stop in his endeavours to improve. All that I proposed in offering these cautions, is only to prevent persons from attempting totally to reverse the schemes practised in all places, without a proper attention to all circumstances, as I am afraid that this practice would rather check than diffuse the true spirit of improvement.

Of the preceeding management of the Farm.

By the preceeding management of the farm is meant, the scheme of agriculture that has been prosecuted by the farmer, the particular manures used, and the times when they have been applied: The knowledge of this, though not so important as the things already mentioned, is however not to be despised. If the preceeding management of a farm has been attended with success, the farmer should not be rash in changing it, however contrary it may be to his maxims of agriculture: The surest principles of agriculture, as well as of every other art, are those that are founded upon experience. It is from experience that we ought to form them; and therefore a successful scheme of management is not to be changed, because it may be inconsistent with some of the principles which we have embraced. On the contrary, we ought to change our principles when we find that they are opposed by experience, or cannot be reduced to practice. It is certain that schemes of management, successful in one place, are sometimes unsuccessful in another, though there does not appear any great

difference in the soil or climate. Our knowledge of agriculture has not as yet arrived at such perfection as some vain persons imagine. No man, whatever he may pretend, can certainly determine, that a scheme, of the goodness of which he has even had long experience, will succeed in a different part of the country; and therefore when a farmer lays aside a scheme that has been practised with success upon his farm, and adopts another, though this other may have been practised with success in another part of the country, yet still it may be said, that he gives up a certainty for hope, and a hope too perhaps not very well founded.

But, although a successful scheme of management in a farm is not to be rashly changed, yet certainly it may be improved: And, for this purpose, it ought to be attentively considered with relation to the climate, the soil, the manures used, and the particular plants cultivated: For, if these things are properly considered and attended to, new experiments may be tried with greater safety, and alterations made with less danger.

The preceeding management of a farm is worthy of our attention, not only when successful, but also when unsuccessful. When it is considered with relation to the things before mentioned, the cause of the bad success may be found out, and such alterations made as may rectify the errors that have been committed.

There is another reason for attending to the preceeding management of the farm. Manures operate differently: Some of them add vegetable food to the soil; some exhaust what the soil contains; some are quicker, and others slower in their operation. It is necessary therefore to know what manures have been applied, and at what times, that so it may be known what manures are most proper to succeed, and how they may be most properly applied.

Of Oeconomy.

By oeconomy, when applied to a family, is meant such an application of money, and such a management of things purchased, as makes the best figure in housekeeping; so by oeconomy, when applied to the management of a farm, is to be understood such an application of the strength upon the farm as does most work, and performs this work to the best purpose. This, if it is not of all other things the most important, is however so important, and so little attended to by those who have attempted improvements, that it needs to be very particularly insisted upon.

By oeconomy the expence of management may be greatly lessened, and the work too better performed. The lessening the expence of management is an object of great importance, and is every day becoming more so; for this expence is every day becoming greater, and bearing a higher proportion to the produce of the farm. If it had been increased by these things only, which in the same proportion increase the value of the crop, the lessening it would not have been an object of greater importance than formerly: But this is not the case; this expence has been occasioned by the increase of taxes, and a variety of other things which contribute but little to increase the value of the crop.

There are a variety of things necessary in the management of a farm, that are expensive to the farmer. The principal of which are, Timber, Iron, the expence of smith and wright-work, the wages and maintenance of labouring servants, and the price of labouring cattle. When the expence of managing a farm at present is compared with what it was about thirty years ago, a remarkable difference appears. There is not one of the articles mentioned that is not greatly heightened to the farmer, and there are some of them, and these too the most important, that are more than doubled. Many things have contributed to heighten this expence. The increase

crease of trade and manufactures, the improvements carrying on in agriculture, and the exportation of useful hands to the plantations, occasion a demand for labouring servants, which has naturally heightened their wages; and luxury, which has descended to the lowest class of mankind, and become almost universal, has, in the same proportion, heightened the expence of their maintenance. The great increase of taxes, increasing the necessary expences of the tradesman and manufacturer, has obliged them to raise the price of their labour. The increase of Currency, occasioned by the national debt, and the many banks lately established, has raised the price of every commodity. This last indeed has produced no disadvantageous change upon the whole, as it has raised the value of the produce of the farm, in the same proportion as it has raised the expence of management. But the other things, on the contrary, have greatly raised the expence of management, while they have but little effect in raising the value of the produce: And indeed that has now arrived at such a height, as to make it absolutely necessary in the farmer to give the greatest attention to oeconomy in all his operations.

The principal thing in oeconomy is to have an uninterrupted succession of useful labour during all the seasons of the year. In order to this, there must be a proper scheme of management: the farm must be properly laid out, and proper attention given to the times of plowing.

The succession of labour must be kept in view in every scheme that is proposed: For it is certain, that a scheme, though most specious upon paper, and which might succeed very well if we had strength at command, and were obliged to pay for labourers and labouring cattle only when we used them; yet, if it requires more labour at one time and less at another, than the ordinary schemes of management, will upon trial be rejected. The reason is plain, the additional strength that this scheme requires is a certain expence, while the advantages

pro-

proposed are uncertain ; and if there is no additional strength, the work cannot be performed in its proper season, and on that account no great advantage can be expected from it *.

The succession of labour must likewise be kept in view in the way of laying out the farm into breaks. It should be laid out in such a manner, that each field, if possible, should contain only one kind of soil, and if there is both wet and dry land in the farm, matters should be managed in such a manner, that there may be a part of both kinds for every grain that is cultivated in the general scheme of management. If a farm is laid out without any regard to this, it may happen that there shall be nothing but wet land for one kind of grain, and nothing but dry land for another. The disadvantage of such a division is obvious: The time of plowing the wet land, may fall in with the rainy season, and thereby an entire stop be put to the labour, or the work very ill performed. On the other hand, when the farm is laid out in such a manner, that there is a proportion both of wet and dry land for every grain, then there is always some of the land in a proper condition for being plowed, and there is never any necessity either for delaying the work, or performing it improperly.

The giving proper attention to the times of plowing, is another thing which I mentioned as of consequence to have a succession of labour. In many farms there are fields that much rain or severe drought reduce to a situation improper for being plowed. The attending to the proper time for plowing these, is of great importance. The farmer that goes on
plow-

* In the scheme of management commonly practised in East Lothian, there is a proper succession of labour. After harvest the barley land gets the first furrow, and the wheat seed is sown ; after these, the land is plowed for the oats and pease, and the seed sown ; then the barley land gets the stirring furrow ; and after that, is seed-furrowed and sown. In summer the fallow is plowed, foreign manure provided, &c.

plowing for the different grains in their order, and the different fields as they ly most contiguous, without any regard to the wetness or dryness of the land, will frequently find, that he must put a stop to his work, or, what is worse, plow his land in bad order; whereas the farmer that attends to the situation of his fields, and, before the wet season comes on, plows such land as is in the greatest danger of being rendered unfit for being plowed by too much water; and, before the dry season sets in, plows the land that is in the greatest danger of being rendered unfit for being plowed by too great drought, will seldom be stoppt in his work, and will seldom be obliged to plow his land in an improper situation.

This oeconomy which I have been insisting upon, is of so very great importance, that I am persuaded it is the giving a proper attention to it that chiefly distinguishes the good from the bad farmer. The seasons for plowing and sowing, the particular plants proper for the soil, and the manner in which the different crops should succeed each other, are determined by the practice of the country: But it is the farmer's own diligence, and his judgement in timing his work, that produces that oeconomy by which he makes the most of the strength of his farm, and performs his work to the best purpose. It is this therefore that chiefly distinguishes the good from the bad farmer: And though it is certain, that one scheme of management is much better than another, yet, at the same time, it is as certain, that the farmer who neglects oeconomy shall not prosper with the best scheme, while he who observes oeconomy, with a scheme greatly inferior, shall be successful.

ARTICLE II.

The FARMER's KALENDAR ; or, a Monthly Directory for all sorts of Country Business ; containing plain instructions for performing the work of various kinds of farms, in every season of the year. Respecting particularly, The buying, feeding, and selling live stock—The whole culture of arable crops—The management of grasses—The oeconomical conduct of the farm, &c. By an experienced Farmer.

ONE of our correspondents, to whose judgment we owe some deference, observing some very useful instructions taken into our former volume, [Vol. I. p. 125.] from this valuable work, has suggested, that it might be of very great utility to the Farmers of this country, to have a regular KALENDAR set before them, to direct the course of their operations through the whole year: And that although this work is calculated for the meridian of England, whereby the works there prescribed are rather a month too early for our climate, and that severals of the articles relate to the more improved state of Agriculture in that happy country; yet the SCOTS FARMER may reap considerable advantages by it, if he carries a little attention and oeconomy along with him in his operations †, and thereby obviate the first objection; and the second he thinks may be avoided, by your leaving out such articles as will not apply to our present state of Scots Agriculture, or are not interesting to the SCOTS FARMER.

Resolving to comply with this request, We here present our Readers with the *Introduction* to that Work, and in our next Number, shall give the *Kalendar* for *January*, under the foresaid caution; and, if it is approved of, shall continue it through the whole months of the year, under the caution given us by our correspondent.

† See the 11. page of this number.

INTRO

I N T R O D U C T I O N.

GARDENERS have found great use in Kalendars of the necessary work for every month in the year; and, if the two professions be well considered, it will appear, that FARMERS want such a remembrancer, at least as much as their brethren in the garden.

The enquiry is not the utility of such a work to old, experienced, and good husbandmen; because no country is cultivated by such alone; but to younger and less able ones, such a work cannot fail of being an useful companion,

At the beginning of every month, a Farmer, whether he has or has not a book of this sort, should reflect on the work to be done in that month: he ought to foresee the whole, or else it is impossible he should make a proper provision for it.

Now I leave to any one to judge, if this just idea can be gained so easily, and be so complete, without some further recollection than mere memory; and if a book of this sort but once in a year reminds him of some important work, which he would otherwise have forgotten, it will by every one be allowed to pay him ample interest for the small sum that is requisite to purchase it.

I hint this, because common farmers are generally poor, at least in what concerns the purchase of many things they think superfluous; I would therefore shew them, that a book may be of some use: a truth they will not all acknowledge.

As to the Kalendars which have hitherto appeared, they are very slight sketches; added to other books; extremely imperfect, omitting at least as many useful articles as they have given; in works of high prices; and, in a word, scarcely in the least instance precluding the want of such a book as is now offered to the publick.

About fifty years ago, a celebrated Englishman, Mr Tull, made many experiments, in a new method of culture, the
great

great design of which was to set aside the use of manures. To this day he has had many followers. With the gentlemen that pursue his system, tillage alone is necessary—the plough is all in all, and nothing is to be dunged, or otherwise dressed, but meadows or pastures. Were such ideas to become general, it is inconceivable how much mischief they would occasion; for there cannot be more false principles, than those whereon they are built. Throughout these sheets, care is taken to keep clear of such errors. The great importance of manures is duly attended to, and the farmer well instructed how to raise as much as possible himself. This part of husbandry can never be too much attended to, nor can any have been more neglected by the generality of writers; indeed, except by one or two, (who it must be owned have treated it in a very masterly manner) they have not thought it worthy their attention.

There is another point in which all the old writers of husbandry are totally deficient; it is that of farmers keeping accounts; this is a matter of very great consequence; and, as the monthly directions could not include it, it will be proper to be a little particular on it here.

It is not long since a specimen of accounts was laid before the public, consisting of several books, in imitation of merchants accounts; but I humbly think, that too complicated methods should not be recommended, least the farmer, instead of being enlightened, should only be disgusted. The grand object is to keep a Ledger, or account for every article in the farm; in which an account should be opened, for every field in the farm, or at least for every arable field, and one for all the grass. The farmer should in this book directly, without the intervention of a waste book or a journal, enter all his expenses; but, for doing this, he must take the trouble of dividing his rent to every field, so that the account may be complete, and not have an article for rent alone, unless it be a mere memorandum; and before he ballances his books at the end

of the year, it is necessary for him first to cast up the fundry accounts, such as tythe, poor levy, various expences, and divide them in the same manner as rent.

To explain this, let us suppose, that under the article tythe he enters the round sum he pays the parson this year, (which may vary the next) as it is for all his thythes, grafs, arrable, small tythe, &c. It is a gross expence for the whole farm in general, and therefore, if it comes to L. 100, and he has 400 acres, he should enter it 5 s. per acre to every field. In the same manner, the poor tax, and other parish charges, should be managed: these vary every year; at the end, the sum total should be divided among the acres, and charged to each field. Another article is, the fundry expences, such as odd labour that concerns no particular account, bailiff's wages, expences at market, and, in a word, all money spent that cannot be properly placed to distinct accounts. The sum total to be divided as above. Fences are another article, which should be thus divided. When this method is followed, the farmer has it always in his power to see the real profit and loss of every field, which is a point of great consequence. He can then at any time, by turning over his book, see what courses of crops have paid him best; he may discover in this manner, that in several fields of the same soil, some courses have paid him far better than others. For instance, he finds that a ten-acred close, thrown into the system of, 1. Turnips, 2. Barley, 3. Clover, 4. Wheat, has paid him at the end of eight years L. 126 - 18 - 4. And that other ten acres, thrown into 1. Fallow, 2. Wheat, 3. Barley, 4. Oats, paid him, in that time, no more than L. 68 - 16 - 2. He sees at once how greatly preferable one course is to the other, and not only from a general vague idea, but a clear ballance struck between them. In the same manner, he compares all his sorts of cattle, and sees at one view which answers best. No person can doubt of the great advantages of this conduct being carried through a farm: it is what has properly been explained by no author, but, to
make

make it perfectly simple and plain to the capacity of the lowest farmer, it would be necessary to give more minute examples than are proper for this introduction.

The advantages, which must follow so accurate an attention to husbandry as a Kalendar leads to, with a due consideration of the importance of regular farming accounts, brings me to offer a word or two on the profit of husbandry when properly conducted. Whoever will give good attention to improvements, will find it a business yielding better interest for money, than any other, and at the same time wonderfully healthy and agreeable: It is in every scale, from the largest tenures down to the least farms, nearly connected with all the enjoyments of a country life, with house keeping, horses, equipage, sporting, &c. &c. And if there is the least prudence in the management, many advantages of every kind may be reaped, without falling into dangerous expences.

The benefit of being able to employ small sums of money is peculiar to husbandry. What trade can be set up without introduction or partnership, in which a man can employ five hundred pounds? In most, he must have nearer five thousand; but in husbandry, a young man, that is not extravagant, and will mind his business, may, on such a farm as L. 500 will stock, live very agreeably; for it will fix him on eighty or an hundred acres of good land, which will yield him an annual profit of from L. 100 to L. 200 a year clear, or from 30 to 40 *per cent*, for his money.

But when I speak of such a profit, it is to be understood, that I mean by following a somewhat better husbandry than common. Bad common management will not yield so great an advantage, but improved methods change the case greatly; not however that I would by any means recommend his deviating in the expensive gimcrack parts of husbandry, which are fit only for gardens or experiment-grounds; but merely to adopt the culture of such plants as will pay well for an accurate management *in large*. I have mentioned his
farming

farming so little as eighty or an hundred acres; but a much smaller quantity may be profitably managed, and yet a team kept.

A good farmer will always remember, that there is more profit in a masterly cultivation of a few acres, than in the slovenly conduct of many.

Lucerne, cabbages, carrots, and potatoes, may every where be safely introduced, excepting certain soils, few in number, that are improper for some of them. If the culture of these plants is pursued, a team may be employed on a very small farm with advantage; but, as manuring of all sorts is of infinite consequence, especially to these luxuriant growing plants, a small farm, on which they are introduced, would be particularly profitable, if situated within reach of a town, where manures could be purchased; because then all the time not wanted in tillage, &c. might be employed in bringing dung, &c.

To state a case, which will explain this idea, and illustrate some particulars in the ensuing pages: Suppose the team of a little farm to consist of four horses, and the distance from purchased manure such as admits of one journey every day, the expence may be stated as follows.

Keeping 4 horses a year, exclusive of summer food,	£. 40	0	0
1 Man,	25	0	0
Wear and tare,	20	0	0
300 Waggon loads of manure, at 5 s.	75	0	0
Beer for the man, and turnpikes, 300 journeys, at 1s. 9d.	26	5	0
Total	186	5	0

300 waggon loads.

600 cart, at 6s. 3d. a load.

This

This is the price, at which he would get the manure, whether he thus employed the team a whole year at it, or only a part.

Suppose the farm consisted of five acres of lucerne, five of natural grass, and thirty five of arable land thrown into the following course: 1. Potatoes, 2. Carrots, 3. Cabbages, 4. Barley, 5. Clover, 6. Clover, 7. Wheat. Ten acres every year of clover, and five of each of the other crops. And suppose further, that the potatoes, carrots, cabbages, half the clover, and the lucerne, every year manured as above, with 12 loads an acre, at 6*s.* 3*d.* In this case the expences per acre would be nearly as follows: The lucerne, 6*l.* the cabbages, 7*l.* the potatoes, 8*l.* and 10*l.* more for buying lean hogs to fat. The carrots 10*l.* and 20*l.* more for buying hogs to fat: The wheat 3*l.* 15*s.* the barley, 3*l.* 15*s.* the clover half at 4*l.* 14*s.* and a half at 1*l.* 10*s.* the grass at 1*l.* 5*s.* rent and charges.

All expences whatever are included in these sums.

Expences.

5 acres of lucerne, at 6 <i>l.</i>	£. 30 0 0
5 of cabbages, at 7 <i>l.</i>	35 0 0
5 of carrots, at 30 <i>l.</i>	150 0 0
5 of potatoes, at 18 <i>l.</i>	90 0 0
5 of wheat, at 3 <i>l.</i> 15 <i>s.</i>	18 15 0
5 of barley, at ditto,	18 15 0
5 of clover, at 4 <i>l.</i> 14 <i>s.</i>	23 10 0
5 of ditto, at 1 <i>l.</i> 10 <i>s.</i>	7 10 0
5 of grass, at 1 <i>l.</i> 5 <i>s.</i>	6 5 0
Sundry labour in carting it home, &c. &c.	30 0 0
Total	£. 409 15 0

Product

Product.

Product of 5 acres lucerne, and 5 cabbages; the keep-			
ing 17 cows, at 6 <i>l.</i> per cow,	£. 102	0	0
5 acres carrots, at 700 bushels per acre;			
3500 bushels, at 6 <i>d.</i> per bushel.	£. 87	10	0
Prime cost of the hogs.	100	0	0
		187	10 0
5 acres potatoes, at 500 bushels per acre,			
2500 bushels, at 9 <i>d.</i> per bushel	£. 93	15	0
Prime cost of hogs	50	0	0
		143	15 0
5 acres of wheat		40	0 0
5 of barley,		35	0 0
10 of clover, 5 loads hay at 30 <i>s.</i> 7 <i>l.</i> 10 <i>s.</i>		75	0 0
The grafs for the horses			
Total,		583	5 0
Expences,		409	15 0
Clear profit,		173	10 0

There can be no doubt, but this cultivation might be realized in any place, the situation of which would admit the above suppositions. The crops are large, but not too great for such most uncommon improvement by manuring. Here we see how great a profit may be made by a spirited husbandry on a small space of ground; but common farmers will never equal any thing of this sort, for want of attending more to useful books, which point out the culture of these valuable plants, and direct their management. This instance shews the importance of attending well to husbandry, under certain improvements, which render it so much more profitable than most other businesses. An employment of money, that will allow of such great advantages, much deserves a little more than the attention of common farmers. It is to be hoped, that this Kalendar will assist in such undertakings, and not be turned

turned to in vain by others, who design to pursue only the usual system of management.

Husbandry is an art so extremely various in its operations, its professors have such a perpetual call for their attention, and every month brings so many works, that must be executed in a given time, and some of them almost to a day, that scarcely any business requires a better memory, none a stricter observance of seasons. An old experienced farmer may not want a Kalendar, to remind him of the work necessary to be done, in every month, upon the generality of farms; but to younger ones, and the whole tribe of gentlemen farmers, such a companion cannot be altogether useless.

Husbandry has, for many years, been my only business; and the work, now published for the use of my brother farmers, is actually an enlargement of a manuscript originally drawn up for my own use. I found the benefit of such a monitor so great, that, for several reasons, I kept adding fresh particulars, as they occurred in the practice of my business, and have ever since experienced no slight advantage from often turning over my Kalendar, to see if I had the works of the season in hand.

I have been as concise as I could in the directions how each business is to be performed. Some instructions of this sort were necessary for the young practitioner; but it was likewise necessary to keep such parts within due bounds, and not swell them with all the minutiae of Farming.

A R T I.

ARTICLE III.

Scheme of Horse-hoeing Husbandry

[In a Letter to the PUBLISHER.]

IT is proposed to labour a Farm of 340 acres, of which 240 to be perpetually in Wheat, 50 to be in Corn and Pease, and 50 to lye in Grass. These two fiftys to be changed alternately according to the country method: The whole dung in the Farm, and manure that can be collected from abroad, to be laid on the grass, in order to enrich it for being broke up in its turn.

Quer. What strength of men and horses will be sufficient for this purpose?

Resp. Six men and six horses through the whole year, and two men and four horses from the beginning of September to Martinmas: but as the man who labours constantly with six horses must keep seven in order to make the calculation easier, we shall set the whole at eight horses and seven servants for the whole year.

Expencc. To avoid further the trouble of calculating the expence, which must vary according to the price of labour in different countries or parts of a country, we shall allot the 100 acres of corn and grass to maintain the horses and servants, and pay wages; and to pay rent, and furnish feed for these 100 acres.

This being premised, the charges on the hoed crops are as follow:

1. The rent of the ground is uncertain; but such as will produce the crops to be after-mentioned is not worth more, as ground is commonly let, than ten shillings per acre.

N. B.

* This scheme was sent us by a correspondent, who assures us it was practised by an actual farmer, who still continues the practice: But he has not favoured us with his name, or the country where he resides.

N. B. The higher the rent the more profit will accrue to the farmer, provided the ground be answerable in richness to the increase of the rent.

Inde for 240 acres

£. 120 0 0

2. A stock of *l.* 500 is supposed necessary for beginning this undertaking, the interest of which, at 10 *per cent.* for the capital sunk, is

50 0 0

3. Eight horses valued at *l.* 90, on which 15 *per cent.* for tear and wear

13 10 0

4. Carts, ploughs, harrows, drills, and all other tackling, the value of which may be *l.* 80, on which 15 *per cent.* as above

12 0 0

5. Seed wheat, at 3 pecks to the acre, being 45 bolls, at 15 *s.* per boll

33 15 0

6. Hand-hoeing and weeding the wheat rows. This expence cannot easily be computed, as it decreases every year ; but may be set at 2 *s.* 6 *d.* per acre

30 0 0

7. Cutting down the wheat crops at 2 *s.* 6 *d.*

30 0 0

8. Threshing out, at a twenty fifth part of the crop, 48 bolls wheat, price as above

36 0 0

Total expence £. 325 5 0

Per Contra.

By 1200 bolls wheat, which, computing at 5 bolls per acre, and setting grain and fodder at 15 *s.* per boll,

£. 900 0 0

This calculation comes out so large on the profit side, that a deduction may be made from the crop as an addition to the expence of management, leaving still a reasonable reward to the farmer for his skill and labour.

The proportion of ground to the strength of men and horses above required, so much exceeds the allowance in the common method of labouring, that it seems to need decyphering.

EXPLANATION. The foregoing scheme depends upon the most favourable supposition both as to soil and climate. That from the first of March to the middle of July, the ground may be dry enough to allow five days plowing each week, taking one with the other, during the season. The best soil for this husbandry is a loam or black earth upon a sandy bottom; and in such a soil, and upon the east coast, the allowance of five days in the week may be given. In more rainy climates, or wetter soils, a deduction must be made. But be the soil and climate what they will, each of the six horses employed in the summer plowing takes on eight acres of wheat for each plowing day allowed in the week, over and above the quantity of ground allowed for labouring in the common way as above: That is to say, allowing five plowing days in the week, each horse takes on 40 acres of wheat: Allowing four days only, 32 acres; and so on to one day in the week.

Suppose the 240 acres dressed in five foot ridges, and the cropt drilled in two lines upon the top of each ridge, the partition or empty space between these two lines being six or eight inches; and a deep furr or trench between every two ridges: the bringing the ground into this shape will, no doubt, take both time and expence: but the expence being in proportion to the situation and nature of the soil, and also to the skill, industry, and abilities of the farmer, cannot be easily calculated; part of the L. 500 stock allowed must be applied here.

The strength supposed for the spring and summer plowing being six horses, mounts three two-horse-ploughs; each plough in eight hours going, by turning the furrow from the wheat, to make a veering in the interval where the trench was before, plows three acres. Thus every plowing day clears nine acres; and consequently the given acres are done over for the first time in something less than 27 days — The second plowing or horse-hoeing throws this veering to the wheat rows on both sides, and is performed by a plough having a mold-board on each

each side. This plough requires three horses, and throws out in this manner six acres in a day; consequently two of these ploughs turning twelve acres every day, go over the whole in 20 days.—The third plowing is performed as the first; and the fourth as the second; 94 days being the time it takes to finish the whole operation. But the plowing days between the first of March and middle of July, computing at five days each week, are 98.

The plowing necessary to form the ridges for the seed cannot so easily be computed, I mean proportioned to the strength; as the labour of the four additional horses between the months of September and November must be applied here at such times as they are not employed in carrying home the crop which is uncertain. When the veerings are formed, whereon the next crop is to stand, we throw them in with a strong plough, to which we put three horses, at two large furs; and the Hintings on which the last crop stood, are thrown out by the double-mold-board plough.

These Hintings can be thrown out in the wettest weather; so that we reckon we can plow all the six days in the week in the goose-harvest. The reason we take three horses to form the veerings for the next crop, is, to give it a greater depth, because upon the height and fineness by pulveration of this veering, depends in a great measure the goodness of the ensuing crop,

In general, sixty days plowing of the ploughs forms the ridges, twenty days harrowing with two horses, and twenty days drilling with a single horse, finish the whole.

As to the hundred acres proposed for the common method of labouring, these are to be one half in grass, and the other in spring crops alternately; so as these crops must have but one plowing between Martinmas and the beginning of March, that there may be no interference with the horse-hoeing: All the dung and manure that can be got ought to be laid upon the grass. And as the two hundred and forty acres in wheat
require

require no dung, but on the contrary add greatly to it, it is supposed that the corn crops, on breaking up the grafs, will not be inconsiderable.

Schemes may no doubt be formed, for improving this part of the plan; but as these would require a greater number of horses, they do not properly fall within this design, which is to shew how much more ground may be cultivated in this way, than can be by the common methods with the same strength, and how much better crops may be obtained.

As I have stated the expence high, so I have brought the crops low both as to value and quantity. As to the value it is to be noticed, that the horse-hoed wheat is always 1s 6d. or 2s. per boll better than the common wheat. And as to the quantity to be got from an acre, I shall relate my own experience, which is from a field of eleven acres, one third whereof is very rich ground, about a half middling ground, and a sixth, very bad thin soil, and on a bottom of pure sand. The whole may be called a dry friable soil; But the lower part is subject to be overflowed by a river, and is the richest. When it came out of the tenant's hands I sowed it with oats broad-cast; the second crop was beans and pease in the same way; the third was drilled barley for hand-hoeing; the fourth was horse-hoed barley; and till now that the eighth crop is standing on it, it has been kept in horse-hoed Wheat. About two acres of the lower part of it was trenched the first year; but none of it has got any dung or manure since the tenant left it. The horse-hoed barley had four bolls the acre; the first of wheat six bolls, the second five only, for the overflowing of the river had damaged the lower part considerably; the third crop of wheat had seven bolls; and the present crop, 1759, looks still better than the last. It comes out $7\frac{1}{4}$ bolls.

I had the curiosity to try what was the difference of the produce of the best and the worst of the ground last year: I found twelve bolls on the acre of the best, though all the ground is continually under the same culture and management. I judged
the

the middling ground to carry from four to six bolls per acre, but made no trial. This may be a lesson to the farmer to choose well the soil he proposes to cultivate in this way.

I shall conclude with observing, that farmers ought not to embarrass themselves too much with the new philosophical dissertations on vegetation, that seem to be coming into vogue at present. These gentlemen appear to be less anxious to instruct the farmer how to get good crops, than to inform him of what materials God Almighty makes plants—a subject, I presume, they will not soon be master of. The philosophical tenets, necessary for a farmer, may be reduced to four heads.

1st, That the spreading and encreasing the roots of his plants augments the crops.

2^d, That deep and frequent plowing facilitates the spreading and increase of the roots.

3^d, That turning the surface frequently up to the sun and air, especially in summer, adds to the fertility of his soil.

4th, That there is a certain proportion of seed and number of plants, which will bring the greatest crop on a given quantity of ground; and he ought to endeavour to find these out, and to apply the whole strength of his ground to his crop only, taking care to destroy all intruders that endeavour to come in for a share of it.

A R T I C L E IV,

Of the misapplication of Lime.

[In a Letter to the PUBLISHER.]

I am one of the readers of your useful Miscellany, and highly approve of your scheme. By collecting a number of observations and experiments drawn from real practice in different parts of the kingdom, a practical system of agriculture

culture may be formed, infinitely superior to any of the fine spun theories we daily see published. I observe, you have several valuable correspondents in East Lothian, [Vol. I.] whose real practice (from my own knowledge) agrees exactly with what they have laid before the publick. But although we are got pretty much into the spirit of improvement in this part of the country, and you have many readers here, yet, so far as I have observed, you have not one correspondent.

Permit me, therefore, to throw in my mite, and to lay before the public such observations as occur to me in practice, which may induce others of much greater abilities to do the same. If the following remarks on the management of lime meet with a candid reception, I shall continue my correspondence, and send you my observations on any other subjects that may merit your attention.

The principal manure we use here is lime; which is found to pay exceedingly well, though at the distance of sixteen or eighteen miles: It costs us, including carriage, 7. s 6. d. or 8. s. the cart load *. Though this expence be very great, it is often, in a great measure, thrown away by an improper management. Some, out of a view to outshine their neighbours, or other mistaken notion, undertake more in a season, than they are able to accomplish, and drive lime as long as the weather permits; so that, in the latter end of the year, when they intend to spread it, wet weather sets in, and prevents them. Perhaps the land is level, or in the
cross

* We beg leave to notice to this, and to all our correspondents, that the expression of a *cart load* is rather too indefinite to convey a determined idea; carts are used of various dimensions, and when cart loads are mentioned, the quantity of firlots or bushels they contain, or with which they are commonly loaded, would then fix the precise quantity of lime or dung, &c. that is meant to be expressed. Lime is generally sold in this country by the wheat firlot or bushel.

cross furrow, and therefore both lime and land (unless a very dry soil) is obliged to lye fouring all the winter season: Whether the lime loses any of its good qualities in such a situation I shall not pretend to determine; but sure I am, that land lying wet all the winter after fallow, when plowed in the spring, is very unfit for vegetation, and the lime will prove of little or no effect the first year.

There is another way in which a great deal of lime is lost, which is, by spreading it on the land when there is too much wind: By this means, the finest particles of the lime are carried away, and the owner hath nothing left but the grosser parts, which are least fit for his purpose.

The alteration of ridges (even in very dry land) often proves the destruction of a great deal of lime. To level high ridges, and lime them that season, is a very great loss, which I have felt by experience; the furrows of the old ridges is loose earth to a certain depth, and the lime is carried by the rains to the bottom, where it is entirely lost, and it will prove of little or no use to the crowns of the old ridges, which, having been deep hid, have never had the benefit of the air (so necessary for vegetation); that, until they be exposed to it for a considerable time, no manure can be of any great service to them.

To prevent these losses, high ridges ought to be levelled gradually if the land is in tillage, some years before it is fallowed for lime; or if it is coarse outfield, it ought to be fallowed two years, as it is much better to lose a crop before lime than after it, and run the risk of losing the lime also.

Land thus managed, the new ridges ought not to be made high, because where the furrows of the new ones happen to be on the crowns of the old ones, they will be quite deprived of soil. And when the land is limed on the level, the new ridges ought not to be gathered oftener than once, that is to say, the crowns this year to be made the furrows
the

the next ; and the wetter the land, the narrower they ought to be. Ridges six feet wide, if properly water furrowed, will be as dry as those gathered to a considerable height ; for although a piece of the crowns of high ridges may be dryer, the furrows will be wetter ; and upon the whole, the narrow ones will be dryer, and plow sooner after wet weather.

Near KELSO.

R. G.

ARTICLE V.

On Brining Wheat.

THE following receipt will assuredly prevent the smutt, and render both the sowing and drilling of the wheat much more easy and certain, (I mean as to the quantity) than any other method hitherto practised, that I ever heard of, by the following pickle.

A tub is to be procured that has a hole at bottom, in which a staff and tap-hose is to be fixed over a wisp of straw, to prevent any small pieces of lime passing (as in the brewing way) ; this done, we put 70 gallons of water, then a corn bushel heap-full of stone-lime unflaked, stirring it well till the whole is dissolved or mixed, letting it stand about 30 hours, and then run it off into another tub as clear as we can, (as practised in beer) ; this generally produces a hoghead of good strong lime water ; then add three pecks of salt, 42 pounds, which, with a little stirring, will soon dissolve ; thus we have a proper pickle for the purpose of brining and liming our seed wheat without any manner of obstacle, which is more than can be said, in doing it the common way, and greatly facilitates the drilling.

Herein we steep the wheat in a broad bottomed basket of about 24 inches diameter, and 20 inches deep (for large sowings made on purpose) running in the grain gradually in
small

small quantities from 10 to 12 gallons, up to 16 gallons, stirring the same; what floats we skim off with a strainer, and is not to be sown, then draw up the basket to drain over the pickle for a few minutes, all which may be performed within half an hour, sufficiently pickled, and so proceed as before. This done, the wheat will be fit for sowing in 24 hours, if required, but if designed for drilling, two days pickled will be found best, and if prepared four or five days before hand, in either case it makes no difference at all that I know of; but should the seed be clammy, and stick to the notches in the drill box, more lime must be added to the lime water; here the master must use his discretion, as the case requires, for some lime has much more drying or astringent qualities in it than others—If sea-water can be obtained conveniently, much less salt will suffice, but some will be found necessary even then, otherwise the light grains will not float, a thing of more consequence than is generally imagined, and ought to be skimmed off and thrown aside for poultry, &c.

I say this from well grounded experience, having practised these methods for 30 years past, and never had any black wheat when prepared as above, either from sowing or drilling, on great variety of soils, and large quantities too, all which is confirmation enough to continue its practice; and thus, seeing its utility, I throw another mite into the noble treasury of arts, &c. for the benefit of my countrymen, which I trust will be acceptable.

P. S. On experiment, it has been found, that wheat may be sown in two hours after being put into the brine, provided the brine is strong enough, and due attention is paid to the strength of the lime water.

ARTICLE VI.

Of the management of Horses employed in the Works of Husbandry.

[From the *MUSEUM RUSTICUM*, Vol. I.]

UNdoubtedly the Horse is the most useful creature we have: it is therefore well worth our while to be attentive to his health.

I have always had a particular regard for this noble animal; and it has been my constant endeavour, to make his necessary servitude as easy and comfortable to him as possible.

Horses are naturally lovers of liberty, and we ought, in gratitude, to allow them as much of it as is consistent with the work we should reasonably expect from them.

Most of the disorders to which they are subject arise from the too great restraint they are kept in *. What can be harder than, after working them eight or nine hours, to tie them up with a halter in a stall not more than four feet wide, and perhaps seven or eight long, there to remain for the rest of the day and night? whereas, had they their liberty, at least a reasonable share of it, allowed them, they would much sooner recover their fatigue, and enjoy by far a better share of health.

This I know to be a fact from my own experience; for I never keep my horses confined in a stable, winter or summer, and find great benefit from this practice; for my horses seldom at any thing, are not subject to coughs and colds, and last me more years than my neighbours.

I have two fields of ten acres each near my house, and I have a stable built so as to afford a ready entrance into each field.

In

* We agree with our correspondent in this point, and think horses should have more liberty allowed where it is in any sort convenient: in large cities this cannot be done; they may however be now and then supplied with green fodder, which would be of great service.

In these closes I let my horses range alternately, in each a year at a time; and I have always one of the fields either in wheat or barley, with both which crops I sow a small sprinkling of clover; and in this manner they pay me very well.

I do not depend much on the pickings my horses get of the clover; though it is of some service to them; for they are always regularly fed, winter and summer, in the stable, where I have, for that purpose, a rack and a manger properly fixed.

Their general food is, in summer, green fodder mowed fresh and fresh, and laid for them in the rack; and this consists of either clover, saintfoin, or good meadow grass: they have besides a proper allowance of corn, which is always proportioned to the work they do, and the condition they are in; and I do not confine them to oats alone, but allow a variety of beans, peas, tares, oats, barley, and even small wheat, and sometimes rye. I find by this management they eat their meat heartier, and with a better appetite, and their health is much better preserved *.

In winter I allow them a moderate quantity of good sweet hay; but the greatest part of the corn they eat in this season is given them unthreshed, which is an excellent method: it saves hay, as they necessarily eat a great deal of the straw or haulm with it, and their appetites are thereby constantly kept up, and they do their work with cheerfulness: besides, this way of feeding prevents your plowman from giving them more corn than they ought to have, and from starving three or four horses to make one uncommonly fat, which he happens to take a particular liking to.

The

* We have known many gentlemen practise this method of permitting their horses to range at liberty over a few acres: it is certainly conducive to their health; on which account we recommend it. Our correspondent's other remarks on the management of this generous animal seem very worthy of notice.

The stalls in my stable are constantly kept well littered, that the horses may lie down, either by night or by day, at their ease; and they generally prefer lying in these stalls to sleeping in the open air; in summer, because the flies are there less troublesome; in winter, because they find it warmer, and are not so much exposed to the inclemency of the weather.

By the practice of this method with my horses, none of them are ever troubled with greasy heels, which chiefly proceed from their standing too long in the same posture without exercise. In the ordinary way of managing horses, they are always either hard at work, or standing still: this must of course be unwholesome, and a mean is necessary betwixt the two extremes. A moderate exercise is always wholesome to animals; and if you give a horse the liberty of ranging at will over a few acres of land, nature will prompt him to be as much in motion as is necessary for his health.

Many have asserted that the haulm of peas and tares are unwholesome food for horses; but I never found them so. I know however that they are not good, in too large quantities, for horses that are kept confined in a stable; but let them have the use of their limbs, and this fodder will do them no injury.

I imagined, that, in such a work as yours, a hint or two for the benefit of so noble an animal as the Horse could not but be proper: this induced me to write, and this will, I hope, induce you to give a place for my letter in your collection: it is but short, and that may probably be a part of its merit; tho' too much cannot be well said on a good subject, especially if it is properly said. How far I have been guilty of impropriety, yourselves must be judges: I have related such facts as I have myself experienced, and which will stand the test of future trials.

ARTICLE VII.

Observations upon the management of Cattle, and raising Calves.

[From Select Essays on Commerce, Agriculture, &c.]

WE do not pretend, in this article, to give a detail of the method of managing cattle: We propose only to make some remarks upon points, which we have observed too commonly neglected. For this purpose, we cannot dispense with censuring a general fault of all those, whose fortunes are under a mediocrity; for people of these circumstances, finding it impracticable to make large profits, reject disdainfully the small advantages continually in their power; mistaking the chagrin of envy, and the langour of indolence, for marks of the elevation of their spirit, and of the nobleness of their sentiments. In vain, the Wise Men informs them, that whoever neglects small profits, will decay day by day: in vain reason dictates, that from a small stock they must be contented with small gain; but that a great number of small profits, which it is easy to multiply by labour, become in a short time an object of consideration. Although experience confirms these truths daily, by the decay or prosperity of some one of their neighbours, they shut their eyes to the true causes of these events, and impute them to those that are suggested by malice and indolence.

From the care of cattle result the most speedy, the most abundant, and most lawful advantages. There are but too many avaricious monopolists in the country, who, hoarding up the corn they cannot use, with a view to profit by some future bad crop, pave the way for a general scarcity, which, whenever it afflicts the nation, they endeavour to prolong. But this wickedness cannot be practised with cattle. Whoever should persist in keeping more of them than he can maintain, would expose himself to inevitable ruin, by starving his cattle, and he would be very soon obliged to get rid of them. There can be no objection against him, whose stock is in proportion

portion to his pasture: He contributes towards the public good, by multiplying the species, by procuring plentiful crops, with the manure he provides for the ground, and by lowering, as much as lies in his power, the price of the most necessary commodities, by the abundance he brings to market.

We must not however imagine, that, in order to derive a considerable advantage from cattle, it suffices to have a great number, and to give them the necessary fodder: there are many other circumstances to be attended to, without which it would be in vain to flatter ourselves with the expectation of riches. In limiting the subject to horned cattle, we shall observe, that they are often kept in too narrow stables, from whence many inconveniencies arise. Sometimes being provoked, they fight and wound one another. The most voracious starve their neighbours, from whom they carry off all the fodder within their reach; and the injured cows decay insensibly, become languid, or give little milk. In the summer, the heat incommodes them, a circumstance which makes them grow lean, and diminishes the quantity of their milk. Care then must be taken, that they have room in their stables, that they be cool in summer, and warm in winter. At all seasons let them be dry, for that is a material point. Even in summer, humidity is disagreeable to them, and in winter it chills them. To prevent this double inconvenience, it is proper to pave the stables with a gentle descent, and to dig a sewer to collect all the water. By this means the cattle will lye always dry, and the dung will run no risk of growing fower. Horned cattle contract a habit, sometimes, of licking one another; and that hurts them to such a degree, that a butcher who perceives it, will give less money for them than for others. They are cured of this trick by rubbing the places they have licked with cow dung, the bitterness of which prevents them from re-attempting it.

The desire of profiting by the milk of the cow, is often the cause of the calf's being too early weaned. A month or two more, in fine the time required by nature, would strengthen it

it in its youth ; it would grow more successfully, and in time, fetch a profit with good interest.

But this is scarce done any where.' No sooner is it believed that it may subsist without the mother's milk, than the farmer thinks he gains a great deal by weaning it ; ill-fed, and infirm, it grows at best to be a sorry bull, or feeble bullock, from which little profit can be derived, and much less service.

The principal source of this abuse arises from ignorance, and want of reflection. People either do not know, or do not reflect, that the vital fire inclosed in the heart of a new-born animal must be augmented ; that it attracts and is nourished by that contained in the milk ; that this vital fire, weak at first, would scarce have power to separate the auxiliary fire from the milky particles with which it is incorporated, if milk was a less delicate substance than nature hath formed it for this first service ; but in proportion as the vital fire acquires force, the milk grows thick, because its grosser particles are destined for forming and consolidating the body of the animal.

When the vital fire is arrived at such a degree, as to be superior to the succours which the milk can afford, nature excites the animal to seek a more solid nourishment, and then, but not till then, is the time of weaning it. For by anticipating that time, they run the risk of leaving the animal imperfect in its interior parts ; the aliment which is administered being above its strength, it cannot perform a perfect digestion, and the nourishment it receives is so much the less, as in all natural bodies, the strongest juices, and most efficacious qualities, are always comprehended ; and, as it were, imprisoned in the hardest particles. Hence it happens, that a sickly animal does not derive from the same food, so much nourishment as an animal in health. In effect, the vital heat, too much employed in resisting the attacks of the corrupted humours, hath not force enough to extract from the aliment, the necessary auxiliary fire, which is concealed in its bosom. Besides, the food being but ill dissolved, passes to excrement, producing only a meagre inefficacious dung.

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As therefore, we may be assured, by weaning a calf too early, that it will remain infirm, and of small value; in like manner by leaving it with the mother, as long as its constitution requires, we may expect it will become strong and vigorous, and by following this method, we can hardly fail of raising a breed of cattle, that will redound both to the honour and profit of the farmer.

Young calves are apt to be attacked by insects, which disturb and torment them, while at the same time, they prevent their fattening. In order to preserve them from these insects, and even cure them when they are hurt, it will be proper to prepare an ointment of melted hogs-grease and mercury, which must be kneaded till they are well mixed together. Spread this ointment upon a linen cloth, then wrap it up in three folds, stitch it for a collar to the calves, and it will not only cure them, but likewise disperse the insects.

There is no better nourishment for the young animals than vetches foked in water, till they swell; but observe to steep no more than will serve them for once, because when they remain a long time in moisture, they are apt to grow sour, and so would do them more harm than good.

We shall not insist upon the advantages attending the breeding of young cattle, whatever trouble it may cost; because there is no prudent countryman, who is not fully persuaded of them. To buy what he may have of his own growth, is to a farmer no acquisition but a dissipation; because the land produces no money, which is only to be obtained with the commodities, and very often the purchase of some goods destroys all the profit resulting from the sale of others. It ought, therefore, to be an inviolable maxim, especially with those of narrow circumstances, to spare no pains in improving their flock, making small estimation of what has cost them no money, but frugal as if they had bought it. By this means, if we except great accidents, which can never be foreseen nor prevented, they will find wealth flow upon them annually, though slowly, and lay the foundations of a solid fortune.

ARTICLE VIII.

Thetches, or Vetches, particularly recommended to the attention of Farmers, as affording excellent Green Fodder for Cattle; and being, when plowed in, a good Manure for a succeeding crop of Wheat.

[From the MUSEUM RUSTICUM, Vol. III.]

THETCHES are a grain often overlooked by the farmer; yet are they, when properly cultivated, and applied to proper uses, highly valuable and very beneficial.

They are a very hardy grain, and resist the severity of a severe winter better than most other crops; besides which, they have the additional advantage of growing in almost any soil; but then the farmer is to expect a produce in proportion to the goodness of his land.

I would by all means advise, where it is intended for early feed, or to stand for seed, that the small winter thetch be cultivated in preference to every other sort, because it is not only hardier, but also, being sown about Michaelmas, it is forwarder, to serve as fodder, or will be earlier ready to mow for seed, which is no inconsiderable advantage: for the thetch being a succulent plant, and forming a very thick cover on the land where it is a full crop, it will be in danger of rotting instead of drying, if it should be cut late, or the harvest-weather should be very rainy; but if the winter-thetch is sown early, it will, in general, be fit to mow in July, or the very beginning of August, when there is less danger.

Few farmers allow more than one plowing for thetches: I always allow two, notwithstanding what the neighbouring farmers tell me of turning the fresh soil again down to the bottom of the furrow: I find my advantage in this practice, and shall therefore continue it.

I have generally experienced the first week in October, if the weather is fine, to be the very best time for sowing

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thetches

thetches; and I allow only two bushels of good seed to every acre, which I find full sufficient.

I sow them broad-cast on the rough land, as the plow leaves it after the second plowing, taking care to harrow the field length-ways and cross-ways, in order to cover the seed the better; after which I pass over it a roller, heavier or lighter, according to the nature of the soil and the dryness of the weather, observing, that if the weather is dry, and the soil light, I use a heavy roller, in order to close the pores of the light earth; but if the soil is stiff, and the weather damp, I use a lighter roller, lest I should knead and crust the field over, so as to stop the young shoot of the vetch.

This crop will, in general, choke all the weeds that come up with it; but this must, however, be understood of the smaller sorts, for if there are many large rampant weeds, it will be necessary to have them extirpated with the hook.

Thetches afford excellent food for sheep in the spring, make cows give a great deal of good milk, and horses are fonder of them cut green than almost any other food.

The best way is to cut them fresh and fresh every morning as they are wanted; and if the farmer has occasion for them for this use only, he may sow in the spring, to great advantage, the large thetch, at different times; by which means he will have a succession of crops, which, to give green to his cattle, he should always cut just before the plant flowers, for it is then in its tenderest and most succulent state, and will afford most nourishment; whereas, if he leaves it till the seeds are nearly ripe, the stalks harden, grow sticky, and are of far less value; besides, that many of the lower leaves will, by this time, be withered, or dropped off, and intirely lost.

I must not conclude this letter without mentioning an important use to whichetches are often applied; I mean, a full crop of them is frequently plowed into the land as manure, to prepare it for a succeeding crop of wheat.

When

When thatches are sown with this intention, I would recommend the large sort, and that four bushels of good seed should be used, to be sown broad-cast twice in a place: But my way of sowing it is somewhat peculiar when I mean to plow it in; therefore I think it may not be amiss to relate it to your readers.

Most farmers sow it by casting it twice in a place; immediately after the land is plowed, and then harrow and roll the field; but I proceed as follows.

As soon as the field is plowed, I sow two bushels, broad-cast, on every acre; after which I harrow it length ways and cross-ways. When this is done, I sow the remaining two bushels, and then harrow it twice again with a pair of heavier harrows, and finally, scratch it twice over with light harrows to raise a mould, concluding my work by passing a roller over the whole field. By this management I scarcely ever miss of a full crop, which covers the whole land, chokes the weeds, and serves as excellent manure for the wheat that is to follow.

I have always found, that this husbandry succeeded best in light, hungry, sandy, or gravelly loams; and a brother of mine, who lives in Bedfordshire, tells me it does very well on a chalky soil, provided there is any heart in it.

The time I chuse to plow in the thatches is just after the blossom fades, and the kid begins to form: and it is really surprising to see what a strong fermentation they raise in the soil.

I have sometimes had my crops so heavy, that I have been obliged to mow, or hook up, the thatches before I could plow the land: but this is not often the case; when it is, the farmer has reason to rejoice.

There are, as I hinted in the beginning of this letter, scarcely any soils but the thetch will thrive in, though ever so various in their nature. I am an old man, gentlemen, and, in the course of many years experience, have sown thatches often

on a sandy and gravelly loam, a chalk, though not for plowing in, a gravel, a low damp clay, and a perfect brown loam. On all these varieties of soil have they succeeded with me; but I must note, that the farmer may expect a larger crop from a gravel (I do not mean a pure gravel) that has some heart and strength in it, than from the finest loam, which has been, by a long continued course of bad culture, starved and impoverished.

The large thetch may be sown in January, February, March, April, or even the beginning of May, when designed for green fodder: but I would, by all means, have the industrious farmer avoid sowing it before Christmas, for it is a tender plant, and if hard frosts ensue, he may chance to lose his crop.

I fear I have taken up too much space by the length of this letter; but I hope you will excuse it. I am a great advocate for the new husbandry; yet am I one of those who think it best to recommend to farmers the amendment of their old practices, before we should attempt to introduce among them new doctrines which they do not understand, and which they will, for some time to come, object to, merely because they are new.

A further account of the advantages to be derived from the Vetches; and the method of making them into Hay.

IT would certainly be of great national advantage, could our flock of cattle and sheep be increased, without diminishing the quantity of our lands that are in tillage.

This can no otherways be done, but by encouraging the growth of artificial pastures, which the farmers have of late years fallen into.

The turnip-husbandry is not of very old standing in this island, yet has it made a very rapid progress. The immense utility of it, when properly practised, cannot but be evident,
even

even to an ignorant common farmer, on the slightest inspection. This evident utility of it has occasioned its being almost universally practised in the counties of Norfolk, Suffolk, and Essex, whence it has spread to other parts of England, and is of late even adopted in Ireland, where, I am informed, the gentry are very intent on improving their estates.

The coleseed plant has also its utility; and in many places is as universally sown as the turnip. I have myself very often raised this crop, as well for feeding sheep, &c. as for the sake of its seed, and have had no little success in this husbandry, being very fond of it, as coleseed is an excellent crop to overpower, choke, and destroy weeds.

Many farmers, who hold land of a fenny or moory nature, will, I hope, be encouraged to attempt this husbandry to their great emolument; a husbandry to which they were before utter strangers; for though they might know the upland practices, this could be but of little use to them.

So much in general; but the particular reason of my now writing to you, was to recommend to the industrious farmer the cultivation of vetches as food for cattle.

I have often sown this crop with great success, to prepare my land for wheat, and have always found, that by growing to a large cover they destroy and choke up a great number of weeds, which would otherwise do me immense damage; indeed I think them, for this purpose, next in rank to a hoeing crop.

When I sow vetches before wheat, I always, in the spending my crop, have regard to the condition of my land.* If my land is not in good heart, but wants mending, I not unfrequently fold my sheep on it, and feed off my crop in the field; but if it is inclined to be rank, or the wheat, which is sowed on it, is apt to run much to straw, I often cut my vetches

* Last year I cut my winter-vetches, and fed my horses with them green, and had them off before the middle of June; after which the land was prepared and drilled with turnip, which were a good crop.

es green, and feed my horses in the stable with them. I find no food agree better with them; they thrive well, grow fat, and are always in good health and spirits when thus fed.

I sometimes also mow my vetches when they are in bloom, and make them into hay, in the same manner I manage my clover and meadow grafs; all which I leave in grafs cocks in the field, whilst it is haying, very seldom spreading it, for fear of rain; and after two or three turns it is generally fit to carry.

The great art in making hay of vetches, is to contrive in such sort, that the leaves do not drop off the plants, which, if left too long, or dried too suddenly, they are apt to do; and the farmer is to understand, that great part of the peculiarly nourishing quality of the hay resides in the leaf.

I say peculiarly nourishing; because almost every kind of cattle, as horses, oxen, cows, and sheep, are fond of it, and they all thrive on this food amazingly: this I have often experienced, and moreover observed, that they make no waste even of the stalks, which they eat with an appetite.

In this manner I manage for my hay, when I am inclined to have it very fine and fit for my cows and sheep; and in this manner it is no very difficult matter to get it in good order, sweet and wholesome; but when I intend it only for my horses, I generally let my crop stand something longer; that is, till the kid, or pod, is formed, and the seed about half grown within it.

When the hay is made in this last way, the business is much more ticklish, and constant observations must be made to see when the crop is in proper order to cut; because, if it is left too long, the stalks grow hard and sticky, and the leaves are apt to drop off.

This hay is more nourishing, when cut in this last method, than I can well describe: it answers both for hay and corn; and with this food my horses will be in good flesh, health, and spirit, and be able to do a great deal of work. I have often proved this to be true, can therefore the better venture to assert it.

I have still another method of making these vetches into hay, which is to leave the crop, till the seed is grown to its full size in the pod, though not ripe: I then mow them, and, when dry, thresh them on a cloath in the field; by which means I procure a considerable quantity of pigeons meat, which fetches me a tolerable good price; and this pigeons meat sells better at market, than if the vetches had stood till the seed was thoroughly ripe; for by cutting the crop when the seeds are barely full grown before they begin to harden, they shrink in the drying, and thereby become of a smaller size than they are by nature, and consequently more proper food for pigeons than if they were larger.

I own, the hay in this last method is not quite so good, as many of the leaves will, in spite of all the care that can be taken, drop off, and the stalks will be a little sticky: yet, after all, it serves very well for my ordinary cattle, and even for my plow and cart horses, with the assistance of a few oats.

Vetches are a very good plant to sow thick on land, and when they have formed a perfect cover, to plow them in, in order to the land's being sown afterwards with wheat on one plowing. In this intention they answer to the full as well as buck-wheat, or clover.

When a farmer intends to plow in his vetches, I would by all means advise him to do it some weeks before he sows his wheat, that they may have time to ferment and rot, or the consequences may be fatal to his crop: I once myself lost the chief part of a fine field of wheat by this oversight.

I should be glad to see some of your very ingenious correspondents enlarge more than they have yet done on the subject of manures, the nature of the several kinds being very little understood by common farmers; yet is there nothing more dangerous than a misapplication of them; and to this misapplication of manures may we, in a great measure, ascribe the present slovenly method of husbandry practised in most counties, the failure of crops, and the abundant increase of noxious weeds.

A R T I.

ARTICLE IX.

Of the Improvement of Wet Pastures

[YOUNG'S Farmers Letters, Vol. I.]

AS I have, within a few years, not only had some experience in my own farm, but observed the methods employed by many neighbouring gentlemen and farmers in mending their pastures. I shall communicate a few of my remarks on the improvement of wet pastures; a subject which may prove, perhaps, of some little utility, as I shall speak of nothing but what I have either performed myself, or seen in my neighbourhood.

The particular lands of which I speak are loose, woodcock, brick-earth soils for about eighteen or twenty inches, and under that, clay to a great depth.

Some that I have improved myself are exactly level, so as to be quite poisoned with the wet, which could not drain off.

From the best observations I could make on many experiments, the following is the method which answers best to improve them. I shall also insert the expence.

The first thing to be done is, to make large deep ditches round every field, and if they are large, to divide them into smaller ones, of five, six, or seven acres each, by new ditches: nothing is attended with a more sudden improvement of all the ground near the borders of the fields, than good ditches.

I generally make mine six feet perpendicular deep, seven wide at-top, and three at the bottom. I never pay for them by the rod, (which is customary) but give two-pence halfpenny per load, of thirty bushels, for all the clay, &c. that is thrown out of them, and two shillings and sixpence a score loads for filling and spreading it.

These ditches should be made in such a manner, that no water can remain in them, but a descent from one to another to carry it quickly off.

It may be easily imagined how much these must drain the land, besides the quantity of excellent manure (clay) which arises out of them. Add to this, the great convenience of having such fences about a farm, that the farmer is sure to find his cattle wherever he turns them, instead of their breaking perpetually into his corn or hay-fields, which, in multitudes of farms, is so often the case: it is sometimes the work of a boy, only to be hunting after hogs and sheep that go astray for want of good fences.

In the banks of new ditches we always lay white thorn, fifty roots to a rod (the workmen are allowed sixpence per hundred for gathering them;) but I always avoid intermixing any thing with it, especially heshal, for in the nut-season fences are pulled in pieces for the fruit by all the boys and girls in the neighbourhood; and oak, ash, &c. only to give an opportunity to get over the hedge with great ease. Sallow, willow, elder, &c. are to be avoided in the hedge, or by way of hedge-stake for the dead hedge, as they grow so fast as quite to overshadow the quick-set, and even destroy it. After frequent cuttings, to render the plants thick and strong, I keep the quick-sets regularly clipped, which, in a few years, render the fence impenetrable to man or beast, considering the largeness of the ditch.

If an old fence is grown bad or thin, or composed of improper plants, I never yet observed it improved by planting quick-sets in the gaps: the best way is, to reverse the bank, and plant fresh white-thorn.

When the ditching is done, the next work is to land-drain the whole fields in such a manner, that every part of them may be laid dry. In a pasture of six acres I did two hundred rods. If there is the least fall in any part, or any place more wet than others, the drains should be cut through them. If the surface is exactly level, the depth of the drains should vary, so that the water may every where have a descent.

These drains are made here, in general, thirty two inches
Vol. II. N^o I. G deep

deep, twenty inches wide at top, and four wide at the bottom. They are filled eight inches deep with either stones or wood; but I should ever recommend the former, as the most effectual and lasting, to those who are not desirous of saving the difference of the expence [Vol. I. p. 158.] However, I know many fields in this parish and neighbourhood, that are drained with wood, and which answer extremely well; and I have been assured that they will last twenty or thirty years †. Nay, in some parts of Essex I hear they do it with straw alone; but this must be of service for only a few years, unless the soil, when the straw rots, forms an arch; if stone be used, there can be no doubt of its lasting. The labour of the whole is three-pence per rod.

If with stone of the farmer's, a load of thirty bushels will do three rods, and costs one shilling and a half penny stubbing and picking; so the expence of a rod is seven-pence, besides carriage of the stone, which will not be much: but if he buys his stone, as is much the most probable in this country, we may suppose he must go two miles to fetch it, and give twenty-pence for thirty bushels ready picked: the carriage is worth as much more, thus the stone, in this way, will cost per rod better than thirteen-pence.

If bushes are used, a load of forty faggots will cost the farmer, if he buys them, or be worth, if he has them, five shillings, and cost cutting one shilling ‡. They will do ten rods; so that the whole expence of doing a rod with them will be ten-pence, and with stone one shilling and four-pence.

The very first year the prodigious advantage of these drains appears, especially if the season proves wet. The grass (or corn if in ploughed fields, for they answer in all) will be fresh, vigorous, and sweet, wherever the pastures are drained.

† I have met with some in perfect order, 40 years old; and likewise many that run as well as stone ones.

‡ Good bushes proper for strong fences cannot be had under 7s. per load.

I have a field of six acres (mentioned above) which, by land-draining, ditching, and manuring, is an exceeding good pasture, and has produced two tuns, and ten hundred weight of hay per acre, in a very good year, and generally thirty-five hundred weight per acre; whereas the pastures adjoining are scarce worth the farming, and let but at seven shillings per acre, producing scarce any thing but a little feed for lean cattle. The soil is the same in both; the six acres, about twelve years ago, being full as bad as the rest.

To improve such wet land, nothing can be more advantageous than the clay which is thrown out of the ditches. Eighty loads per acre is the quantity I have laid on, and have been told by several sensible farmers (who clay a good deal) that it is a proper covering; but if nothing is mixed with it, ninety-five or one hundred. I know a piece of grass land greatly improved, on which were spread one hundred and fifty loads per acre.

My method is to make a large hill of manure, by first laying a quantity of clay regularly on a heap; then placing a thin layer of muck, such as I have, upon it, either my stable or rack-yard dung, or bringing it of any kind in my waggon from the nearest town; on this layer, another thick one of clay; then the second of dung, and so on; letting the proportion be about twenty loads of dung to fifty of clay. These heaps, after remaining six months without stirring, I mix well together by turning them over, which a workman will do, at the rate of eight shillings for one hundred loads. Let it lie six months longer in this state, and then carry it on to the land, paying two shillings and six-pence per score loads for filling and spreading. This I take, from experience, to be by much the best way of manuring with clay, as it works and impregnates the soil much sooner than alone.

Whenever I clay arable land, I do it on clover-pastures, after the crop of corn is off, managing it in the same manner as for pastures. If it is plowed in directly, it is several years before it works; but having a winter and summer to dissolve and powder it, it washes

washes into the soil more equally, and much enriched by the effects of the air, acquired by being so long exposed.

These are the principal points to be observed in improving such wet, cold, loose pastures as I have described : some that I have quite changed by these means were half over-run with moss and rushes ; but draining them thoroughly, and claying them; kills all trumpery of this sort, and presents the farmer with so admirable a view of good pasture for dairy or grazing, where so lately nothing could live, as to be equalled in scarce any thing of the kind.

But as all improvement ceases to be such, when more money is spent in it than the advantages will repay, I shall, in a few words, set forth how far this is from being the case here. I will suppose two or three fields are improved, amounting in the whole to twenty acres.

	<i>l</i>	<i>s.</i>	<i>d.</i>
Sixty loads of clay per acre thrown out of the ditches, twelve hundred loads, at two-pence half-penny per load,	12	0	0
I will suppose sixty rod of new ditching done, which, before clay is thrown out by the load, will cost one shilling per rod,	3	0	0
Three thousand quick sets, at six pence per hundred,	0	15	0
Land draining seven hundred rod with bushes (this is the quantity I have now marked out in a field of twenty acres) at ten-pence per rod,	29	3	4

N. B. I had a great part of a crop of barley killed in a field of this size with the wet : I had therefore a fine opportunity of marking exactly where the drains should be made, which ought, on such occasions, never to be omitted, were it only for the common water furrows which are made for every crop. In some fields, unless such a guide offers, it is very difficult to tell exactly where to make the land drains.

Turning and mixing one thousand six hundred loads of manure,	6	8	0
Filling and spreading one thousand six hundred loads, at two shillings and six-pence per score,	10	0	0
Carry over	61	6	4

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Brought over	6	1	6

I will suppose that the work may be done the sooner, if the farmer brings one hundred loads of the four hundred of dung from the nearest town; and as I have not reckoned the horses and driver for the clay cart, I shall not in the bringing the dung: therefore the expences per waggon-load will be, the cost three shillings, boy six-pence, and turnpike six-pence. A waggon-load is two tumbrel loads (in this country) so fifty loads, at four shillings, are

	<i>l.</i>	<i>s.</i>	<i>d.</i>
	10	0	0
Total	7	1	6

This is three pounds eleven shillings and three-pence per acre: and, supposing the profit to last but twenty years, although the draining and ditching part will last twice that time, and the clay five and twenty as good as at first. But the farmers thereabouts seldom change their farms, if tolerable ones, living in them their lives, and their sons after them, with leases of seventeen, twenty-one, and twenty-five years: supposing twenty years profit, I say, the expences will then be, *per acre per annum*, three shillings and six-pence halfpenny.

So small is the expence divided. But now let us consider the profit.

Such land as I have described never lets here for more than ten shillings per acre, by far oftener for eight shillings, or eight and six-pence: and it is from my own experience, as well as various observations, that I assert the same land, after the improvements, will let to any tenant for seventeen, eighteen, and twenty shillings per acre.

I will suppose it only sixteen shillings, though I am certain that it is considerably under the mark: he then gains, in point of rent, six shillings per acre; and the whole calculation is absurd, if we do not add this whole proportional profit on the acre: supposing his profit on it before improvement was a rent, ten shillings; afterwards it will undoubtedly

ly be the same, at least; which adds six shillings more to the profit; so that the whole will be twelve shillings per acre per annum.

	L.
Twelve shillings per acre is per annum, for twenty years,	240
Expences of improvement, - - -	71
Clear profit, - - - -	<u>169</u>

	l.	s.	d.
That is per annum, - - - -	8	9	0
Deduct the interest of seventy-one pounds, -	3	11	0
Clear profit per annum, - - -	<u>4</u>	<u>18</u>	<u>0</u>

I think the case of this improvement is stated clearly; and must repeat, that I speak from experience. The sum to be expended on twenty acres will appear large to most farmers, whose property is not considerable; but the proportion holds for a single acre, and those who cannot afford to improve twenty, may three, four, or five; and I make no doubt but in such an attempt they will find their account in it greater than I have stated it.

As I have mentioned a tumbrel-load to be thirty bushels, and a waggon load to be but two tumbrels, I should observe that we carry away of muck fifty bushels at a time in our tumbrels, and so agree with our men in proportion to the thirty bushel loads.

I have observed, that in making new ditches, or enlarging old ones, I seldom pay by the rod, but by the load: however to those who chuse the former way, I would recommend that they have them worked by a frame of small flit deal, nailed into the exact size of the intended ditch, and agree with the workmen to do their work by it: this will prevent disputes which frequently arise.

ARTICLE X.

Of the culture of Furz or Whins for Winter Fodder, and of its great benefit as Food for Horses.

[From the *MUSEUM RUSTICUM*, Vol. I.]

THE great aim of the present farmers seems to be the procuring plenty of winter fodder at a cheap rate. To answer this intention, they should some of them practise a method much in use in the Principality of Wales.

As we do not in many districts there sow any great quantity of corn, straw for fodder is a scarce commodity: besides our lands being poor, what straw there is, must of course be short.

To remedy this evil we sow furz, otherwise called gorse or whins: this we cut at three years growth, and after passing it through a machine which cuts and bruises it at the same time, we give it to our horses, which feed on it, and thrive to admiration.

I have had much experience of the benefit of this food; it is healthful, strengthening, and gives them spirits; they are fond of it, and eat it without inconvenience, the spines which would prick their mouths being broke by the machine. I have kept nine or ten horses for some years past, in winter time, chiefly on this food.

We cultivate it in manner following. Almost any soil will do for it, but it should not be too wet.—After plowing the land, it is sown with a broad cast: one pound of seed is enough for an acre, though some sow more. The farmer sows a certain number of acres, in proportion to the number of cattle he has to feed.

The second and third years he sows the same quantity of land with the same crop.

The third year, as I mentioned above, the furz is fit to cut from the first sowing, and the others in due course follow.

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Some poor husbandmen, who sow but little, send every morning, during the winter season, two men into the furz-field with a scythe, and a large basket slung on a pole; these mow it, tread it into the basket, and bringing it home, they prepare, with the machine above mentioned, the day's allowance of food for the beasts; the basket, in general, holds enough to serve for the days.

This practice of sowing furz might certainly be followed with profit in many parts of England: I know, myself, several places where there are large tracts of poor land fit for this purpose, and winter fodder is exceeding scarce; but the misfortune is, this method is not generally known, and wants the sanction of authority to recommend it.

Having a horse which had been over-worked, to the appearance of a surfeit, I treated him in the usual manner for that disorder; and knowing how necessary it would be to his speedier recovery to give him green food after his physic, it occurred to me that furz might answer the purpose immediately, as there could be none of the common herbage procured before the end of April at soonest: I therefore had a quantity of the tops and tenderest parts of that plant cut daily to preserve it fresh, which I hashed upon a block, with a very long and heavy chopping knife, as small as possible, and then beat it again over the same block with a carpenter's mallet, (which blunted in a great measure the sharp prickles), and gave half a peck a day of it to the horse (in the stable), which eat it most greedily, and received so much benefit from it, that he is totally recovered, and carries a very fine coat.

The success of this experiment led me to consider the great utility this plant may be of to poor people, who live in the neighbourhood of large commons over-grown with it, as food for cows in winter, when fodder is dear, and in reality not so proper for milk cattle as this green food, which must naturally increase their milk, and from the fragrant smell it sent forth while cutting, it may reasonably be conjectured, will give no ill taste to it, as many vegetables do.

T H E
SCOTS FARMER,

DECEMBER 1773.

A R T I C L E X I .

Of the choice of Seed, and of Sowing—Of the culture of Wheat.

[Dickson's Agriculture, Vol. II.]

MR Dickson having premised some general things to be attended to in the management of a farm, [see N^o I. p. 1.] before he proceeds to give directions for the culture of particular grains and plants, takes under consideration two articles, which have always been considered as of great importance in farming, the choice of seed and the manner of sowing it.

Of the choice of Seed.

The generality of farmers are careful to choose the best of their grain for seed. Where the rents are paid in victual, the farmer has this in his power; and the landlord must content himself with what is inferior in quality. This is certainly a very good custom; for upon some soils, the seed that is sown degenerates.

But this assertion, that seeds degenerate, must be confined to the seeds of such plants as are not natural to the soil and climate; for if it required such pains to prevent every kind of corn from degenerating in every soil and climate, the corn in some countries would have been by this time reduced almost to nothing. It is probable that the corn, that is not natural to

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the soil and climate where it is sown, degenerates, till it arrives at a situation in which it becomes natural to these, and that then the ordinary culture given is sufficient to preserve it from any further degeneracy. Almost all the corn which we cultivate in our fields is of this kind, and therefore the greater care that is taken in the culture and the choice of seed, it will be preserved in a state the more perfect. This care may not only preserve some of the corn, which is not natural to our climate and soil, from degenerating, but may also be a means of improving that which is natural to it. But though corn degenerates, yet it does not arrive, by once sowing, at that state of degeneracy that renders it natural to the soil. It may be sown many years before that happens, though every year it may be drawing by degrees nearer to it; this makes it necessary for the farmers, in whose land the corn degenerates much, to bring their seed from soils and climates to which the kind of corn they sow is more natural, and even for the farmers who possess these better soils and climates, to be very careful in choosing the best of their grain for seed.

It is a general opinion among farmers, that the changing of seed is attended with advantages, though there should be no difference with respect to the quality. It may be observed, that different soils are infested with different kinds of weeds, according to their natures; and that the weeds that infest one kind of soil, are not to be seen in another. As this is the case, the sowing seed from a different soil is attended with this advantage, that no dangerous weeds are sown with the seed. It is very difficult to free corn altogether from the seeds of the weeds that grow amongst it: When corn therefore is sown upon the same kind of soil from which it has been reaped, the weeds sown along with it being adapted to the soil, naturally prove hurtful; but, when seed is sown from a different soil, though there may be weeds amongst it, and these weeds may spring up, yet, receiving no encouragement from the nature of the soil, are soon destroyed.

It is uncertain, whether there is any other advantage arising from a change of seed of equal quality. If there is, it must be of that kind of grain that is adapted to a variety of soils and climates; and the advantage must arise from some particular quality that the seed acquires by being often sown upon the same kind of soil: but this falls more naturally to be enquired into, when treating of the culture of particular plants.

Of Sowing.

There are two different ways of sowing. In the ordinary way of sowing, the seed is scattered by the hand; and men, by practice, become tolerably exact in doing it. The other way is by a machine called a *Drill*, made on purpose. This machine is more troublesome in sowing, and less expeditious than the common way of sowing by the hand; and, like all complex machines, is apt to go out of order, and put a stop to the work: but then the sowing by it is attended with advantages that do far more than overbalance these. This machine is constructed in such a manner, as to distribute the seed with the greatest exactness, so that the precise quantity proposed may be sown upon any field, and, at the same time, the seed equally distributed over all. But there is still a greater advantage that attends sowing by the drill; the regularity with which the seed is sown, allows the corn to be cleared of weeds, with little trouble, and at no great expence. The drill sows the seed in rows; this allows the hoe to be used for the destruction of the weeds, which cannot be done when the seed is scattered in the ordinary way.

The quantity of seed proper to be sown depends upon a variety of circumstances; the kind of seed, the season of sowing, and the situation of the land. These things fall naturally under our consideration, when the culture of particular plants is treated of. However, it will not be improper in this place to consider, in the general, whether the sowing thin or sowing thick is most advantageous. It is not necessary to be very particular

particular in explaining what is meant by thin or thick sowing. The sowing less than what is commonly done in any part of the country, is thin sowing; the sowing more than this, is thick sowing. The generality of the writers upon this subject recommend thin sowing, and they complain much of the obstinacy of the farmers, * for not following their directions. The farmers are not so obstinate as not to try the different ways of sowing, nor so ignorant as not to know when to sow the one way, and when the other. They often sow thinner than they ought to do, as appears from the situation of the crop; and perhaps as many farmers may be found that lessen their crops by sowing too thin, as there are that hurt them by sowing too thick. I am persuaded that the quantity of seed commonly used is the most proper. The farmers in general, whatever they may be in other respects, are certainly attentive enough in their management to every thing that saves expence. Their greatest fault, generally speaking, is the one opposite to this. They scruple to lay out money, though the advantage is obvious; but they are apt enough to enter into the saving plan, whenever there is a probability that it will succeed. Had the trials of sowing thin, which have been made, proved very successful, we may be certain that the practice, before this time, would have become general.

Previous to the insisting with the farmers to use a smaller quantity of seed than they commonly do, they should be directed to clear their land of weeds; for, without this, the using less seed, instead of being beneficial, must certainly prove a real disadvantage. Some of our richest lands in Scotland are very much infested with weeds, and the preparation made for sowing gives such encouragement to the vegetating of their seeds, that the land produces for certain a plentiful crop of some one thing or other. If a small quantity of seed is sown, a great many weeds spring up along with it; these weeds prevent all the advantages of thin sowing: they prevent the corn from *tillering*, or *stooling*, as we call it in Scotland; they keep
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the air from the roots of the corn, and thereby expose it to be lodged; and besides, they come to perfection themselves, and sow their seeds: Whereas, when the seed is thick sown, the corn soon covers the surface, and prevents many of the weeds from getting up. It must be acknowledged indeed, that, when corn is sown thick upon rich land, it is in very great danger of being lodged; and it is to prevent this that thin sowing is so much recommended: but then thin sowing does not prevent this upon land much infested with weeds, for the weeds shut out the air as effectually as the corn itself when thick sown, and it is the want of free air that makes the corn lodge. When the air has free access, it hardens the surface, and, while the surface is hard, the corn is in no great danger of being lodged: But, when the air is shut out, the surface becomes soft and loose, so that the roots of the plants are not able to support the weight of the top. When corn is thin sown upon land where there are no weeds, the air at first has free access, and, though the plants should tiller in such a manner, as to form as many stalks on the field as when the corn is thicker sown, yet the stalks, standing nearer to each other at the root, the air has easier access round the plants. Hence corn sown thin upon clean land, is not so apt to be lodged, as corn that is thick sown, though there should be an equal crop on the field. But it must be observed, that, if seed is too thin sown, the corn is as apt to lodge as when it is too thick sown. When seed is sown very thin, and the land in very good order, the plants have so much room to tiller, that the top becomes too heavy for the root, and falls over almost of itself. Instead therefore of insisting with the farmers to sow less seed than they commonly do, which in some cases may be dangerous, they should rather be directed to make their land as clear of weeds as possible, and then thin sowing, so far as is proper, will follow in course.

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Of the culture of Wheat.

Wheat is the most valuable grain that is sown in our fields. There are not many places in Scotland where it can be sown with advantage ; for it requires not only a rich soil, but a warm climate.

There are many different kinds of wheat ; The English authors mention no fewer than thirteen different species besides several varieties in every species. Whether these are really all distinct species, or whether the differences that appear betwixt one kind and another, are occasioned by the different soils and climates where they have been propagated, is uncertain. There is no doubt that the difference of climate, soil, and culture, makes a very great change in the appearance of plants. This is well known to every florist. However, it is not probable that any change of climate, or soil, or culture, could produce such a change, as must have been done in turning red wheat into white, or smooth-ear'd wheat into bearded. It is observed indeed, when a kind of wheat is brought into any part of the country, different from the wheat commonly sown there, that, after it has been frequently sown, it degenerates into the common wheat. This has made some persons conclude, that all the difference that appears betwixt one kind and another is occasioned by the climate, soil, or culture. But the degeneracy of a particular kind of wheat, introduced into a part of the country where none of that kind is sown, may be accounted for, without supposing that the climate, soil, or culture changes it. Without very great care after the first sowing, some grains of the common wheat will mix with the other. This may happen by a variety of accidents. The common wheat sown along with the other, being better adapted to the soil and climate, produces a greater increase ; and hence every time that this seed is sown, there is a greater proportion of common wheat sown amongst it, and, at length,

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it becomes almost all of this kind. By these means any kind of foreign wheat, after being frequently sown, may be changed into the common wheat of the country, though they should be distinct species, and would continue so in all climates and soils, if kept quite separate. But this is a subject rather curious than useful, and therefore I shall not insist upon it any further.

Notwithstanding the many kinds of wheat in England, we scarcely know more than two in Scotland, the white and the red. The last is reckoned the more hardy plant of the two, and does very well in some soils and climates where the white does not succeed.

A kind of bearded wheat is used in some places. It has a very strong stalk, and the grain adheres closely to the ear, so that it is not so apt to lodge as the other wheat, nor the grain so liable to be shaken out by the wind. Besides these advantages, it is a hardy plant. It succeeds very well on wet land, and the grain produces a great deal of flour. These things would no doubt render it more common, was it not that the bakers complain, that it makes bad bread. But it is said, if these persons were better acquainted with it, this objection would be removed; for though it makes bad bread when used by itself, yet the mixing it with other wheat, in the proportion of one to three, is a real improvement, and makes better bread than any unmixed wheat.

The white wheat which we have in Scotland is not of one kind; but a mixture of almost all the kinds used in England. This is obvious to every person that takes a view of a field of wheat when it is in the ear. There one may observe some stalks very tall, and others short, though equally vigorous, some ears smooth, and others bearded, some ears long with the grain thinly set in them, and others short with the grain set very close, and the grain itself in some ears very white, and others of a pale brownish colour. This, it is probable, is occasioned by an improper method taken to provide foreign seed.

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It is found from experience, that in Scotland wheat degenerates; for which reason a fresh supply of seed is every year brought from England. This supply is often brought from the granaries about London, where there is a mixture of all kinds; and hence the mixture, which we observe so frequently in our fields here in this country. This is a great defect; for it is probable, that these different kinds of wheat are adapted to different soils; and this defect should be remedied by the farmer. Would some persons, conveniently situated, establish a correspondence with some farmers in England, and get from them annually a quantity of unmixed wheat, of such kinds as are found best to succeed in the soils and climates of Scotland, they would not only find it of advantage to themselves, but would also do a real service to their country.

Wheat is commonly sown either upon land that has been summer-fallowed, or after a crop of pease.

When we propose a crop of wheat after a crop of pease, the seed cannot be sown till the month of October. But when we propose to sow wheat upon fallow, the seed may be sown in the month of August. In Scotland we sow wheat from the beginning of August to the middle of November. It will not be amiss to inquire, Whether there is any season, during this period, more proper than another?

It is the general opinion, that the most proper season is from the end of September to the middle of November. Some years ago, it was a custom in some places in Scotland to sow the wheat upon fallow in the month of August. This practice is now laid aside, for this reason, that the crops were very bulky; but at the same time very deficient.

There is a particular season in which every annual plant should come to its height, to produce its seed in the greatest perfection. If the seed is sown before the time requisite for this purpose, the plant grows larger. If the seed is not sown till after this time, the plant is smaller. It is natural to sup-
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pose that this should be the case, and the truth of it is discovered in a variety of instances.

In summer-fallowing, when a part of the field, after being plowed, is allowed to lye too long before it is plowed again, many of the weeds come to the flower, and begin to form their seed; but these weeds, if the summer is far advanced, are very weak when compared with those of the same kind, upon no better land, that were allowed to grow earlier in the season.

Some of the weeds that grow amongst barley, are not so vigorous as those of the same kind that grow amongst oats or pease, when the land is equally rich.

Those that have tried the sowing of wheat in the spring, find that the plants are not so vigorous as when the seed is sown in autumn, though the ears are sometimes as well filled, and the grain as large. On the other hand, those that have tried the sowing of oats in autumn have observed, that the crop is very bulky, but the quantity of grain not in proportion to the quantity of straw. If it is true then, that plants grow larger when their seed is sown sooner than is necessary to bring them to their height in the proper season, and that they do not grow so large when their seed is sown later than this time; it follows, that in every climate, the crop whose seed is too early sown, is apt to prove a deceitful crop. For it is certain, that the more nourishment that goes to the stalk and leaves of a plant, the less remains to go to the seed: and if the early sowing of wheat is a means to increase the bulk of straw, it must for this reason proportionally lessen the quantity of grain. Wheat in Scotland commonly comes to its height about the middle of June, and October is probably the proper time for sowing, to bring it to its proper height at that season.

But there is another thing that should render a crop of early sown wheat deceitful. It is certain, that wheat sown in August is not eight days sooner ready for cutting than wheat sown on the same kind of soil in October. The time then that intervenes betwixt the sowing and the ripening of the wheat sown in August, is much longer than betwixt the sow-

ing and ripening of the wheat sown in October. Hence it is evident, that, as the vegetable pasture is always lessening from the time that land is plowed, the early sown wheat has not so large a pasture at the time of ripening as the latter sown wheat, and consequently cannot have so much food to nourish the grain.

But early sown wheat is not only more apt to produce a deceitful crop than later sown wheat, but it is also in greater danger of being hurt by spring frosts. Every plant suffers by frost, and the farther that it is advanced, it suffers the more. A degree of frost destroys a plant of wheat when in the ear, that scarcely affects it when young; and the nearer the plants are to this situation, they are in the greater danger. If the winter is mild, as it frequently is in Scotland, wheat sown in the month of August is much farther advanced in the month of April, than wheat sown in the month of October, though perhaps there may not be many days of difference in their coming to their height. Now, if we have severe frosts in April, as is often the case, particularly after a mild winter, the wheat sown in August being farther advanced, is in much greater danger of being damaged.

As it appears improper, from what has been observed, to sow before the first of October, so it seems likewise improper to delay this work till after the middle of November; for after this there is great danger of being interrupted by frost or rain. As the rainy season sometimes sets in early, it is necessary to make all possible dispatch in sowing after the middle of October. And it may not be amiss to observe, that the cold and wet land should be first sown, and the warm and dry land last.

In determining the season for sowing wheat, I have had in my view particularly the warmest climates and soils in Scotland. In such as are colder, it may be sown more early than the first of October: The coldness of these soils and climates is a means of preventing the plants from rising to too great a height

height before they put forth the ear, and makes early sowing necessary, that the crop may be ripened in due season.

Having determined the proper time of sowing, it is necessary next to consider what quantity of seed is requisite. There is sown, upon a Scots acre, from three to five firlots, Linlithgow measure *. The proper quantity is determined according to the situation of the land. In proportion as the land is clean and rich, a smaller quantity is requisite; and in proportion as it is poor and full of weeds, a larger quantity is requisite. Though land may be rich, yet if it is full of weeds, it is necessary to give it a large quantity of seed: for, when the seed springs up, if the corn does not soon cover the surface, and thereby prevent the weeds from vegetating, they spring up also, and endanger the crop. Agreeable to these maxims, we find that it is a common practice to sow less seed upon fallow than after pease.

Some persons recommend a wet bed for the wheat seed. This, considering the season of the year in which wheat is sown, is certainly a very good direction. In the month of August, or even perhaps in the first of September, it is dangerous to sow, if there is not as much sap in the land as to make the seed vegetate; and particularly, if the seed has been steeped in brine and dried with lime. Mortimer asserts, that he has known "wheat mustied and spoiled, so as never to come up at all, that hath lain long in the ground before rain came."

Some of the farmers in this country have observed the same thing.

When barley is sown in May, and the drought becomes so severe as to prevent the seed from springing, if the weather continues

* The Scots acre is to the English as 1 to .7954. The Linlithgow is the standard measure of Scotland, and is the measure always meant in this treatise. The firlot of wheat and pease is a little larger than the Winchester bushel, the firlot of bear and oats one third larger than the wheat firlot.

continues in this situation for three or four weeks, as is sometimes the case, it may be observed that the barley comes up much thinner than ordinary, occasioned possibly by the heat of the month of June. The heat of August may have the same influence upon the wheat.

But though there may be danger in sowing when the land is very dry, and the heat very great, yet surely the most proper situation of land to receive seed of any kind, is when there is no more sap than is necessary to make the feed vegetate. The juices in land are the richer, and contain the greater quantity of vegetable food, in proportion as the quantity of water in it is small: and probably it is an advantage to have seed at first filled with the richest juices; for by this the young plant is rendered healthful and vigorous, and the more able to put forth its roots in search of its food.

In preparing fallow for wheat, if there are many clods or hard pieces of earth on the surface, it is necessary to take the benefit of a shower to harrow the field well before the last plowing or seed furrow. This allows the dung, commonly laid on at this time, to be spread the more equally.

When the wheat land is light, or well reduced by fallowing, it is proper to plow in the seed, or let the land ly some time after it is plowed before the wheat is sown. By this the land acquires a degree of firmness before the harrows go upon it, and thereby the feet of the cattle are prevented from pressing too deep the seed upon which they tread. By this likewise the seeds of annual weeds are more encouraged to vegetate, and a greater number of the weeds themselves destroyed: for when the land is plowed sometime before the seed is sown, two crops of weeds are destroyed, one by the harrow, and another by the winter frost; but when the seed is sown immediately after the plowing, one crop only is destroyed.

The wheat-land should be plowed in such a manner as to raise the ridges higher in the crown than is necessary on other occasions. Land when plowed and harrowed, is in greater danger of being damaged by rain, than when it is plowed
without

without being harrowed, or even when it is allowed to remain unplowed. Land that is plowed and harrowed, does not so easily part with the water which penetrates it, nor is so much exposed to the influence of the winds, as when it is plowed without being harrowed: for harrowing renders it firmer, makes the surface smaller, and more even, and thereby prevents it from receiving so much benefit from the air or wind. Neither can land in this situation so easily resist the rain, and make the water run off into the furrows, as when it is allowed to remain unplowed. In order therefore to prevent, as much as possible, the wheat-land from being damaged by water, it ought to be plowed in such a manner as to raise the ridges higher in the crowns than ordinary; for thereby it is better enabled to resist the rain, and throw it off into the furrows; and by exposing a larger and more uneven surface, it receives the greater benefit from the winds. If the ridges are made narrower than ordinary, the same end is served; for the narrower that the ridges are, the water finds its way the more easily to the furrows, and the winds have easier access. Hence then we may observe, that the old practice in Scotland, the cleaving for pease, and gathering for wheat, was well founded; and also the practice in some parts in England, where the wheat-land is plowed in ridges of four or six furrows in breadth.

When the wheat is sown, and the land harrowed, the field should be carefully water-furrowed; and if there are ridges made at the ends for the plows to turn upon in plowing, a water furrow should likewise be drawn betwixt them and the ridges, the communication betwixt the other furrows and these properly opened up with a spade; these furrows, if necessary, turned into drains, by being made deeper than the plough goes, and, if possible, a communication made betwixt them, and an open drain for carrying off the whole water.

The goodness of the crop depends in a great measure upon a proper attention to these things, without which the best scheme of agriculture cannot succeed.

A R T I.

ARTICLE XII.

The FARMER's KALLENDAR ; or, a Monthly Directory for all sorts of Country Business ; containing plain instructions for performing the work of various kinds of farms, in every season of the year. Respecting particularly, The buying, feeding, and selling live stock--The whole culture of arable crops - The management of grasses --The economical conduct of the farm, &c. By an experienced Farmer.

J A N U A R Y.

S H E E P.

IN this month the farmer's ewes are generally lambing. Great care ought to be taken of them : they seldom want turnips before ; for most farmers have grass enough, either in whole fields, or in borders, &c. for lean stock sheep to pick up a living till they are near lambing, when they should have turnips regularly given them. The best method is to draw the turnips, and cart them to a dry gravelly pasture, and there bait the sheep on them twice a day, observing well that they eat clean, and make no waste ; which is not a bad rule for the quantity necessary. In this way, the turnip crop goes much the farthest. On very dry lands, many farmers, for the sake of manuring for barley, will eat the crop on the land, herdling off a certain quantity for the flock ; and, as fast as they eat them pretty clean, remove the herdles farther. This method saves much trouble ; but it should only be practised on lands that are perfectly and absolutely dry, otherwise the sheep poach it, and do as much mischief as good. The crop, in the driest land, will not go so far as if drawn and laid in a grass field ; for the sheep dung, and stale, and trample on many roots after they are begun, which occasions much

much waste: nor is there any loss of manure in carting them, only it is left, in one instance, on the arable field, and, in the other, on the grass one; nor can any improvement be greater than this of feeding the sheep with turnips; on whatever land they are given, the benefit is always very great.

It is further to be observed, that many sheep are fattened on turnips, particularly wethers; in which husbandry many turnips are wasted, if you have not two flocks; one lean to follow the fatting sheep, to eat up their leavings; for they will not eat clean in fatting.

In very wet weather, storms, or deep snows, the sheep and lambs should be baited on hay; some farmers drive them to hay stacks, which shelter and feed them at the same time; and sheep in general do extremely well so; others give it in moveable racks; and allow a certain quantity every day. It is an excellent method to allow them in their racks a small quantity of hay daily while on turnips, let the weather be good or bad; but it is not absolutely necessary.

In some parts of the kingdom the best farmers give their ewes and lambs in this month bran and oats in troughs, while they are feeding on turnips; but it must be an extraordinary fine breed for such a practice to repay.

FOLDING SHEEP.*

The farmers, even in those parts of the kingdom which understand folding the best, and practise it the most, do not extend

* In England, great stress is laid on folding sheep, even in the most improved farms, and the best soils. In Scotland, folding and tathing is little practised, but upon the outfield pastures, before they are broke up. It is much to be wished, that the practice was more general with us; and the advantages of it are so much praised by the English farmers, that there may be little doubt of its succeeding. The Scots farmer will object, that this cannot

be

extend it so far as they might; they give over folding in *November* or *December*, whereas it may certainly be carried through the whole winter with profit. On those farms which have a perfectly dry gravelly pasture or two, it is highly adviseable to fold all winter on such dry grass land. It must not be attempted on arable land, nor on moist grass; but on dry gravelly pastures: the safety to the sheep is undoubted, and the benefit to the grass prodigious. But there is another method of gaining all the benefit of folding, quite through the winter, and on all soils; this is to confine them at night in a sheep yard, well and regularly littered with straw; rubble, or fern; by which means you keep your flock quite warm and healthy in bad seasons; and at the same time raise a surprising quantity of dung; so great a quantity, if you have plenty of litter, that the profit will be better than folding on the land. And a great improvement in this method, would be the giving the sheep all their food (except their pasture) in such yard; *viz.* hay and turnips; for which purpose they should be brought up, not only at night, but also to be baited about noon; but if their pasture be at a distance, they should then come to the yard the earlier in the evening; and go out the later in the morning, instead of
baiting

be practised in his inclosed grounds, from the certain danger to the hedges and young fences, by the sheep nibbling them and passing through them. This may be true of the small Scots breed, which leap like hares, and where food is scarce, will undoubtedly attack the hedges. It is the farmer's business to provide against the last, and if he will study to improve his breed by importing the larger kinds from England, there will be little danger of their destroying the fences by passing through them; for being much heavier, they are not so apt to jump, and besides the profit from them is much greater, as the bestowing the best pasture upon them is amply repaid by their more early lambing, and often bringing twins.

baiting at noon. This is a practice which cannot be too much recommended; for so warm a lodging is a great matter to young lambs, and will tend much to forwarding their growth; the sheep will also be kept in good health; and, what is a point of vast consequence to all farms, the quantity of dung raised will be very great. If this method is pursued through the months of *December, January, February, March, and April*, with plenty of litter, 100 sheep will make a dung-hill of at least 60 loads of excellent stuff, which, when rotten, will manure two acres of land amply, whereas 100 sheep folded (supposing the grass dry enough) will not in that time equally manure one acre.

F A R M Y A R D .

In this month, a strict attention should be given to the cattle in the yard or yards—those I mean which run loose in them; take care that they are regularly supplied with straw, and that they have always water at command; the thrashers should be so proportioned to the stock of lean cattle, as to make the straw last just through the winter. Take good care also to keep the yard well littered from the stacks raised in the autumn, of straw, stubble, fern, &c. so that the cattle may always lay perfectly dry and clean. Their health requires this attention; which should, however, be given, were it merely for raising large quantities of manure.

C O W S .

Several of your cows will probably calve in this month; about a fortnight before, they should be taken into the cow-house from the straw-yard, and be baited twice a day with green food; turnips, cabbages, carrots, potatoes, or whatever is the winter field food. After they calve they should be separated quite from the lean stock, either into the house or another yard, to be fed upon those articles with straw by them,

but to eat no more than they pleased. Hay must be banished from this management, if you would make much profit by your cows: there certainly is no use in it, which is strongly proved by several good farmers I know, who make turnips and straw do without it; but this is for cows that are suckled: if they are milked, turnips must not be given, as they make the cream and butter taste; and the latter then sells at a low rate. Cabbages, or carrots, &c. should then be substituted, but chiefly the former, which will maintain cows in the cheapest manner in the world, and make the butter perfectly sweet; but you must pick off the decayed and yellow leaves, giving your cows nothing but the heart of the cabbage; the refuse leaves will be eat clean up by the lean cattle. The great expence of winter feeding cows with hay eats up half the profit of the dairy; even if none be given till they calve; for suppose them to calve in *January* or *February*, there remains three or four months at hay.

FATTING BEASTS.

At this time, the farmer, who makes it his business to winter fat, is in the height of his work. There are three methods of fattening; carrying their turnips, &c. to a dry grass field, to a farm yard, or to a house where the beasts are tied up; the two latter methods are the best.—Scarcely any pasture is dry and sound enough to bear the tread of an ox in winter. If you fat in a yard, the food, *viz.* turnips, cabbages, or carrots, must be given in mangers under open sheds, with good straw always in the racks, if hay is short with you; but they will pay you well for hay; the same rule is to be followed in stall feeding; but observe to litter well, else they will presently have a bound hide, and not thrive well from dirt; in either of these methods, you must be well provided with a vast quantity of litter. I would advise three waggon loads of straw, stubble, or fern, to every beast, for so much they will make

make into dung, which ought to be your guide, and not the expence of the litter, as the dung will repay that with great profit. I am sensible less will do; but always remember, that the raising dung in winter is the grand pillar of your husbandry.

S W I N E *.

This is a principal season with swine, both for fattening, rearing, and bringing forth. As the two first are mentioned largely under other months, I shall, at present, speak only of the management of your fows and pigs. They must be kept each litter in a stie, and fed with dairy wath, out of your cisterns, and with the food you stored for them in autumn, either carrots, parsnips, or potatoes. These roots do all excellently for them; to substitute barley or pease, or even purchased brand or pollard, is therefore a most unprofitable conduct. The fows should always have as much as they will eat, or the pigs will suffer; and what is of as much consequence, is keeping them well littered: let them be always perfectly clean; it ensures the health of the pigs, and, at the same time, raises you a large quantity of the best manure, about a farm.

H O R S E S.

One of the most useful general lessons, that can be given to an arable farmer, is to keep his horses always at work: the expence

* The husbandry of swine is little known among the farmers in Scotland, excepting in the North country, particularly about Aberdeen: Elsewhere it is mostly confined to millers and distillers. In England it is a very material part of stock, and great profit is made of them. Is it not a shame to this Country to be obliged to our Neighbours for all our cured bacon, of which the quantity imported to Edinburgh alone is amazing? when our farmers might, with a little attention, supply the market to their own great benefit, and a saving to the Country.

expenſe of a team is ſo great, that, if he does not purſue this rule, he muſt loſe by them. *January* is a month, in which all buſineſs of tillage ought to be at a ſtop: if the weather is a hard froſt, care ſhould be taken, to make uſe of it in carting manures on the farm; if you have compoſts ready for the barley land, do not let a froſt ſlip; or, if you have faggot carting, or the earth of borders under hedges to carry on, keep the carts cloſe to it as long as the froſt laſts. But, if the weather is open, road work muſt be done; carting out the corn will not near employ the teams; all other days the waggons ſhould go to the neareſt town for manure. There certainly are ſituations precluded from this advantage, but not many; how well it would anſwer to keep a team on purpoſe for the employment, depends on various circumſtances; but we may be aſſured, that it muſt always anſwer greatly to employ the teams about it, when they would otherwiſe ſtand ſtill; for then the expenſe is little more than labour, and wear and tear.

The ſame obſervations are applicable to the ox teams; and the farmer ſhould have a ſtrict eye, that both horſes and oxen have plenty of litter; otherwiſe his farm will ſuffer in a deficiency of manure.

THRASHING.

In the thrashing the crops of corn and pulſe, I before remarked, that the farmer ſhould be attentive to proportion his thraſhers to the ſtock of lean cattle, that neither more nor leſs ſtraw may ariſe, than is regularly conſumed. Relative to the management of the thraſhers, the farmer ſhould be very clear ſighted to their motions, both as to the cleannels of their work, and to their honeſty: he may loſe immenſely, if his ſtraw is not thrashed clean; and, as it is a work generally performed by meaſure, the men are too apt to turn over the ſtraw too quick, and thrash out only that corn, which comes

the easiest from the ear. In respect to pilfering, the work gives them greater opportunities for it than any other; for which reason, he should have a sharp look out, and take care now and then to meet the men of an evening in their way home, and to come upon them in the barn, at various times, and unawares. Such a conduct will keep men honest, if they are so already, and prevent many knaves from practising their roguery; whereas an indolent inattentive master will make pilferers.

FENCES.

This is a principal season for hedging and ditching. A farmer cannot give too much attention to the fences of his farm; for, without good ones, he might as well cultivate open fields; he cannot manage them as he pleases, but is forever cramp, for fear his own or other people's cattle should break into his corn or hay fields. In fencing, it should be determined to execute the work in the best manner, which is the plashing method. It is done in the following manner; the men first clear the old hedge of all the dead wood and brambles, and other irregular growing rubbish, leaving along the top of the bank the straightest and best growing stems, whether thorns, hazel, elm, oak, ash, fallow, beach, &c. about five or six in a yard; but, if there are any gaps or places thin of live wood, on each side of such places they leave the more. When this work is done, they repair the ditch; I should never advise a less than three feet by two and a half, and six inches wide at bottom, in the driest soils; but, in all wet or moist ones, never less than four by three, and one at bottom. All the earth that arises from the ditch is to be thrown on to the banks. Your men, if you do not bargain with them before hand, will lay some of it on the brow of the ditch; but this must never be allowed, unless the ditch earth happens to be extraordinary rich, and to pay well for carrying

carrying on to the land, otherwise the grafs of the border is spoiled, and you are at the expence of carting earth, and is worth but little. When the ditch is finished, the men begin the hedge; they first lay a thin layer of dead brambles or bushes along on the bank hanging towards the ditch; then they observe, among the stems left in the cutting the hedge, such as grow in the line where the new hedge is to run, and cut them off about three feet from the top of the bank, to serve for hedge stakes to the new hedge. This practice cannot be too much commended; for these stakes being immovable, and never rotting, keep up the new hedge, so that it never falls, or leans either way. Next they drive in their dead hedge stakes where wanted, chusing fallows or willows, that they may grow. The hedgers then plash down the remainder of the live wood left standing, they cut the stick twice, one stroke near the ground, and the other about 10 or 12 inches higher, and just deep enough to slit out a part of the wood between the two, leaving the stem supported by little more than the bark, or about a quarter of its first size; it then is laid along the top of the bank, and weaved among the hedge stakes. All are served thus; and, where they are not thick enough to finish the hedge, dead thorns are wove among them; then the top of the hedge is eddered in the common manner.

The fence thus made, consists of a good ditch and a hedge, most parts of which are alive; that is, the stakes, and much of the wood that is weaved between them. The importance of having as much as possible of the hedge alive, cannot be too strongly impressed. This management ensures a lasting fence; whereas the hedges that are all dead, presently rot, and fall into the ditch. Those farmers, who live in countries that know nothing of the plashing method, cannot give too much attention to teaching their men; the best way is, to send for labourers from the plashing countries, who, in one season, will

will easily instruct his regular men in the business, which they may afterwards perform without difficulty.

D R A I N I N G.

January is as proper a season for draining as any in the year. As to which see the particular directions concerning the different kinds of Drains given in our First Volume, Art. XXI. p. 156.

A R T I C L E XIII.

Curious observations on the Weather, and the use of the Barometer, when applied to improvements in Agriculture.

[From De Re Rustica.]

THE many advantages arising to the industrious farmer from a fore-knowledge of the changes of the weather, and the example set us by the ancient writers on husbandry, are sufficient enducements for endeavouring to draw the attention of husbandmen to observations, which must be highly useful to them.

It might have been expected, that as such great improvements have been made in natural enquiries during the two last centuries, a more accurate account of weather might have been attained ; yet the earliest writers on husbandry seem to have established more certain prognostics of the changes of the weather, peculiar to their climates, than any have done for ours ; though it may be presumed, that the operations of nature are set in a much clearer light to us, by means of the many discoveries made by the moderns.

The ancients, observing, that the weather of each season set in nearly at a stated time, imputed the qualities of the weather to the influence of some stars which happened then to rise

rise or set. In after-times, monks and designing priests, being willing to procure every merit to their saints, transferred the supposed influence of the stars, to the saint whose commemoration happened near the same time. The moderns, being sensible that the inconceivable distance of the fixed stars, and the smallness of our nearest planets, must render their influence on our atmosphere of no effect, and having little faith in saints, have perhaps injudiciously, rejected the observations of the ancients, without duly considering, that the facts might have been discovered first; and the stars and saints only called in, to account for these facts. The ancients indeed acted more rationally than the monks, in not fixing the changes to a day, but only to stated times of the year, as appears from Columella and Pliny.

As some of the planets, especially Venus and Mars, are observed to disturb the motion of the moon, and as the moon acts so powerfully on the tides, it has been thought probable by some moderns, that the moon and planets, together with the sun, might be the causes of the most considerable changes in our atmosphere, while others, with perhaps more reason, seek for these causes in the earth itself. In all doubtful matters, in which experiments or observations can be called in to our aid, experiments or observations should decide the question. Accurate journals of the weather seem to be here the proper vouchers; but even these are at present rather in disgrace with modern philosophers, who, finding that they cannot trace out the causes of the changes in the height of the barometer, an instrument which they can have constantly under their eyes in their closets, thence too hastily conclude, that no useful inferences can be drawn from observations on the weather: however, Mr Claridge, who in the year 1744 published *The Shepherd of Banbury's Rules to judge of the Changes of the Weather*, was of a very different opinion, when he expresses himself as follows:

"The

“The shepherd, whose sole business it is to observe what has
 “a reference to the flock under his care; who spends all his
 “days, and many of his nights, in the open air, and under
 “the wide spread canopy of heaven; is obliged to take parti-
 “cular notice of the alterations of the weather: and when
 “he comes to take pleasure in making such observations, it is
 “amazing how great a progress he makes in them; and
 “to how great a certainty he arrives, by mere dint of compar-
 “ing signs and events, and by correcting one remark by
 “another. Every thing, in time, becomes to him a sort of
 “weathergage. The sun, the moon, the stars, the clouds,
 “the winds, the trees, the flowers, and almost all vegetables
 “and animals, with which he is acquainted, all these become,
 “to such a person, instruments of real knowledge’—What
 Mr Claridge says of the shepherd, may, with nearly equal
 reason, be said of the farmer.

The slightest observation will convince every man, that
 each year, and the various seasons of the year, have a peculiar
 character, as to rain, drought, heat, cold, &c. and as the qua-
 lity of the seasons has a most sensible effect on the producti-
 ons of the earth, it is evident, that it must be of the greatest
 advantage to the farmer to foresee the changes that may be
 expected; because he can thereby regulate his labours accor-
 dingly.

When the character of the season is once ascertained, the re-
 turns of rain, or fair weather, may be judged of with some
 degree of certainty in some years, and but scarcely guessed at
 in others, by means of the barometer; for in general we may
 expect, that when the mercury rises high, a few days of fair
 weather will follow. If the mercury falls again in two or three
 days, but soon rises high, without much rain, we may expect
 fair weather for several days; and in this case, the clearest
 days are after the mercury begins to fall. In the same man-
 ner, if the mercury falls very low, with much rain; rises soon,
 but falls again in a day or two, with rain; a continuance of

bad weather may be feared. If the second fall does not bring much rain, but the mercury rises gradually pretty high, it prognosticates settled good weather of some continuance. When a heavy rain has fallen upon the mercury's sinking, and its continuing steadily low, the weather is sometimes fair, and promises well; but no prudent farmer should trust to such appearances. There is indeed a caution of this kind, which the poorest may profit by. When the mercury rises high in the barometer, the air sucks up all the moisture on the surface of the earth, even though the sky be over-cast, and that is a sure sign of fair weather: but if the earth continue moist, and water stands in shallow places, no trust should be put in the clearest sky, for it is in this case deceitful.

The character of the seasons is less steady at the equinoxes, and more regular during the intermediate months. Those who favour the celestial influence on the atmosphere, think that the changes of the weather are much regulated by the moon's place in the zodiac, or by her situation with regard to the sun; but observation has not yet ascertained any thing on this head.

Whatever the causes of the changes in the weather, or what is nearly the same, in the motion of the quicksilver in the barometer, may be, whether celestial or terrestrial, their effects are generally felt over a considerable extent of country at the same time. Every one may be assured of this, by comparing accounts, kept at distant places, of the play of the barometer. They will find, that the great falls or rises happen nearly at the same time, in almost all the northern countries of Europe; I say nearly, because a difference will be observed, usually attending the direction of the wind. If these causes were celestial, the effects would be universally the same, except where varied by the situations with regard to seas, mountains, &c. As this is not the case, the causes must probably be sought for in the earth. This opinion is favoured by the observations of miners, who have been generally sensible of

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some prognosticating circumstances in mines, before any change of the weather appeared in the air.

Even the limited fore-knowledge, which is pointed out above, would be of service; for instance, in the month of August, when it would be of considerable advantage to judge when hay should be cut, with a prospect of fair weather to make it; and at all seasons of the year, in order to get ready every thing necessary for carrying into execution the works usual in every season.

Mr Du Hamel has very judiciously added to his journals of the weather, an account of the state of all the vegetables or animals useful in the farm; or, what is the same, of the effects of the weather on them.

The ancients have observed, that the early or late arrival of birds of passage indicate the nature of the approaching season; whether it will be early or late, severe or mild. Linnæus has, in the same manner, advised husbandmen to mark the first signs of a beginning vegetation of plants growing wild, and natives of the climate; for that such, by their early or late shooting, inform the attentive farmer of the approach of spring. He advises the husbandman to extend these remarks to different plants, whose vegetation has been observed to coincide with the times of sowing particular seeds. These are objects highly worthy of a place in a journal of the weather; as these facts will, from year to year, remain a register of the state of every article, which in any degree relate to rural oeconomy. I shall readily send you what observations occur to myself on these subjects, and shall be glad of those of other observers, that every possible light may be cast on these subjects.

In the latter end of March, or generally in the beginning of April, the barometer sinks very low, with bad weather; after which, it seldom falls lower than $29^{\circ} 5'$, till the latter end of September or October, when the quicksilver falls again low, with stormy winds, for then the winter constitution of the air takes place; from October to April, the great falls of the barometer

rometer are from $29^{\circ} 5'$ to $28^{\circ} 5'$; sometimes lower: whereas, during the summer constitution of the air, the quicksilver seldom falls lower than $29^{\circ} 5'$. It therefore follows from hence, that a fall of one-tenth of an inch, during the summer, is as sure an indication of rain, as a fall of between two and three tenths is in the winter.

It must be observed, that these heights of the barometer hold only in places nearly on a level with the sea; for experiments have taught us, that for every eighty feet of nearly perpendicular height, the barometer is placed above the level of the sea, the quicksilver sinks one tenth of an inch: now by an accurate comparison between the motion of the barometer in inland and higher places, with its motion in a place on a level with the sea, the heights of these inland places may be pretty nearly ascertained; and observations must determine the heights of the quicksilver, which in each place denote fair and foul weather.

In all places nearly on a level with the sea, rain may be expected, when the quicksilver falls below thirty inches. This points out one cause of the more frequent rains in lofty situations, than in low champaign countries. Thus double the quantity of rain falls at Townly-hall in Lancashire, than does at London.

Very heavy thunder-storms happen, without sensibly affecting the barometer; and in this case, the storm seldom reaches far. When a thunder storm is attended with a fall of the barometer, its effect is much more extensive. And here I must mention an observation which I have often seen verified, viz. that when the quicksilver falls very low, the weather continuing mild and the wind moderate, a violent storm happens at that time, in some distant place: this accounts for a false prognostic, that the barometer has been often unjustly charged with.

One cannot foresee what useful discoveries may occur by means of continued observations and communications of this kind.

kind. "The race is not always to the swift, nor the battle to "the strong:" even so, useful hints may occur to the countryman, uninformed in philosophical principles.

* * The Editors are greatly obliged to this gentleman for his curious observations, and could wish that some gentleman in the west, or south-west, and another in some part of the north of England, would make the like observations, and favour them with copies. If such observations were begun, say, the first of January next, and continued for some time, the Editors will readily lay them before the public; as they flatter themselves, that many valuable discoveries may be made, and applied to the improvement of agriculture.

A R T I C L E X V .

Method to keep Corn sweet in Sacks, by Dr Stephen Hales.

[Gentleman's Magazine, Vol XV.]

HAVING lately thought of a very cheap and easy way to preserve corn sweet in sacks, as it will be of great benefit to many farmers and others, and especially to poor leasers, who want to keep for some time small quantities of corn, but have no proper granary or repository for that purpose, I thought it my duty to inform the public of it.

Provide a reed cane or other hollow stick, made so by glewing together two sticks grooved hollow: let it be about three feet nine inches long; and that it may be the easier thrust down to the bottom of the corn in a sack, its smallest end is to be made taper to a point, by a wooden plug that is fixed in and stops the orifice. About 200 small holes, of an eighth of an inch in diameter, are to be bored on all sides of the stick, from its bottom to two feet ten inches of its length; but no nearer to the surface of the corn, lest too great a proportion of
the

the air should escape there. By wreathing a pack-thread in a spiral screw like form round the stick, the boring of the holes may the better be regulated, so as to have them about half an inch distant towards the bottom, but gradually at wider distances, so as to be an inch asunder at the upper part, by which means the lower parts of the corn will have their due proportion of fresh air. To the top of the stick let there be fixed a leathern pipe ten inches long, which pipe is to be distended by two yards of spiral wire coyled up within it. At the upper end of the pipe is fixed a wooden faucet, into which the nose of common household bellows is to be put.

Common large kitchen bellows worked, convey about three pints of air at a stroke; but supposing it to be but a quart of air, then at the rate of sixty four strokes in a minute, they will convey a quantity of air, equal to the capacity of a four bushel sack in two minutes. And since one seventh part of the space that wheat takes up, is the quantity of meanders among the corn, which are full of air, a quantity of fresh air equal to it will be blown in among the corn with less than twenty strokes. So that if corn, when first put into sacks, be thus aired every other or third day, for ten or fifteen minutes, its damp sweat, which would hurt it, will in a few weeks be carried off to such a degree, that afterwards it will keep sweet with very little airing. But if corn be got stale by standing long in sacks without airing, it would be too much work to attempt to sweeten it by this method; it is therefore best thus early to prevent that staleness.

Where many sacks of corn are thus to be preserved sweet, it may be well to have much larger bellows with wider noses, for the wider the noses, they will be worked both the easier and the faster. If the sacks are placed so that cats can go between them, it will prevent the mice eating them.

By the same means, many other kinds of seeds, as well as corn, may be kept sweet, either in sacks or small binns: but then the air holes must be made only nearer the bottom of the

the canes, because it must all ascend upwards, since it cannot go through the sides of the binn, as it will through sacks.

But this method will not do for very large quantities of corn in granaries or in ships; which must be kept sweet and dry by means of large ventilators proportioned to the bulk of those quantities of corn.

As it will be of great service to farmers and most other country people, it were to be wished that they were readily accommodated with these instruments, which will be so cheap, and are so easily handled.

ARTICLE XV.

Of the culture of Hog peas in Hertfordshire.

[From the *MUSÆUM RUSTICUM*, Vol. I.]

WE are very fond, in the county I live in, of sowing grey peas, not only by way of changing our crops, but because we imagine the culture they require is of great service to the land, by keeping down the weeds, and bringing the soil to a fine tilth for future crops.

In our light lands we most of us prefer sowing peas to beans, as the latter naturally require a stiffer soil, and do not give us such large returns; neither is the haulm so good, as it will not serve for stover for our cattle in the winter, when we are most in want of it; but the peas straw is excellent for this purpose, being very nourishing and sweet; and the cattle are very fond of it, as it agrees very well with them when given with discretion: it is much best when mixed with straw.

All our cattle eat it almost with greediness, horses, cows, and sheep; but horses that are often put into quick motion should not be fed with it: it agrees best with draught-horses. The grey pea, which we in general sow in our fields, makes
excellent

excellent food for our hogs, which fatten on them sooner and better than on any other food.

We also give them instead of oats to our horses; but in this matter we are very cautious, as it is necessary they should thoroughly dry before the horses taste them; and, indeed, it is by much the safest way to have them first dried in a malt-kiln, when they become excellent provender, and will maintain the horses under the hardest labour; another very particular reason for our farmers giving their horses so many peas is, that they go much farther, and are cheaper food than oats in general are: on this account most of our oats are sent to market.

On our chalky, sandy, or light loams, we sow our grey peas in the broad cast, and plow them in, or else we sprain them in under furrow. This method secures them a sufficient covering, which they would not otherwise have if they were only harrowed in: but the crop would be subject to be ruined by the least dry weather, which often happens after pea-feed time. *

In these light lands we love to sow early, that the young plant may have all possible benefit from the spring rains, which bring them forward, and make them pot better, by being at the bearing time better rooted.

We sow our peas in this manner on light lands with a single plowing †, allowing often five bushels of seed for an acre, when it is sown in the broad-cast way; but three bushels, or at most three and a half, are enough, if the seed is sprained in by a man's hand after the plow: and this, indeed, is the

* The better tilth land is in when peas are sown, the better will be the crop; they thrive better, for this reason, on land that has borne first a crop of wheat, then another of barley: all the plowings both sorts of corn had, are of benefit to the peas.

† For peas to be sown after a single plowing, the land ought before to be in good tith, and well broke, or the crop will be indifferent.

the best way of doing it, as it not only saves seed, which is often a matter worth attention, but the crop comes up in regular rows, and is easier weeded or hoed.

We generally sow this seed in February, for the reasons above-mentioned, contriving to have done before March; the heavy stiff lands we always sow last.

Peas are, in general, very tender; but some of the hardy kinds will be, to all appearance, dead two or three times in a spring, and yet recover and bear a good crop.

Some sow their grey peas in January; but this is not so safe a method, as we have often hard frosts in that month; whereas, after the first week in February, the frosts are seldom of long duration.

About a week after my peas are sown, I give my land a rolling, my light land I mean, to settle the earth about the sprouting pea; and, for this purpose, I generally make use of a tolerably heavy roller, for a light one does little service. Light soils are porous and hollow; therefore they require pressing, to lay their parts closer together, and keep out the chilling frosts, winds, and cold rains, which would otherwise, and frequently do, destroy the infant plant before it appears above ground*.

Some farmers are great flovens in their pea-fields, but I always allow my peas one or two hoeings, according as the summer is wet or dry, and sometimes a weeding besides; and this method I find it of infinite advantage to practise, as the succeeding crop, be it what it may, is always remarkably clear of weeds†, none of those pernicious vegetables having been suffered to perfect their seeds, whilst the pea-crop was on the ground.

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* This practice of passing the roller over light, porous, and hollow land, is to be commended.

† If peas are sown thick, they naturally keep down the weed; but if sown in rows with any kind of intervals, hoeing is necessary,

By these methods of practice I get very good crops of peas from my light chalky loams; but I do not, in every respect, manage in the same manner on some stiff clayey land I have ‡.

On this soil I sow my peas somewhat later, perhaps a fortnight; and I allow the land two plowings before I sow my peas, that *it* may be loosened, and made as hollow as possible, being by nature too compact and close. I here sow peas in the broad-cast way, and harrow them in; but I do not roll them, as it would be apt to knead the land, and form a crust on its surface, which would prevent the tender shoot of the pea from being able to make its way to the air.

I also allow less seed, at most three bushels, often not much above two, for an acre; and this heavy land does not require so much weeding or hoeing, as the weeds are not here of such ready and quick growth.

I have, as well as many farmers who live near me, yet another method of sowing these peas, and that is, on land that is of a middle nature betwixt light and heavy. My usual practice then is to sow half my quantity of seed broadcast, and plow it in; after which I sow the other half on the same land, and harrow it in with a long tined harrow, in the same manner I do on my stiff lands.

Again, on some stiff spewy land I have, I sow my peas in ridges, to keep them from too much moisture: but when I sow them this way, I am under a necessity of hooking instead of mowing my crop, which is an inconvenient and slow method; therefore, for the most part, I think, to be avoided.

These then in general are the methods we pursue in this country in the culture of the grey pea; a corn which we are very fond of, and not without reason, as an intermediate crop.

We

‡ Sowing peas on stiff lands should, if possible, be avoided; beans are much the best for such soils.

We often, indeed, suffer by this our fondness; for if a dry summer comes on, the crops of peas in a whole district are sometimes destroyed in a trice by slugs, which are very greedy of this food, on account of the particular sweetness of its sap.

We have no certain method of guarding against this dreadful evil, any more than against the ravages of game and field-fowls, such as pigeons, &c. which destroy great quantities of the seed immediately after sowing: all we can do, is to allow such a quantity of seed, as that, after all these losses, there will still be enough left to supply a full crop; and this, indeed, is the principal reason of allowing, for our light chalky lands, so large a quantity of seed as five bushels, which would be at least as much again as would be necessary, was it not for the ravages above mentioned.

A R T I C L E X V I.

Soot a proper dressing for Meadows, and recommended as a Manure for Clover.

[From the *MUSEUM RUSTICUM*, Vol. I.]

MANY farmers, in some counties, are at a great loss to find a proper dressing for their meadows: to such I would recommend the use of coal-foot, than which nothing can be more profitable and advantageous; its effects will be very visible for upwards of three years, during which time no other manure need be laid on the land.

Coal-foot * is of a very warm refreshing nature; it cherishes
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* Soot is an excellent dressing for green wheat in February: it should be sown by hand, in quantity sufficient to blacken the land. This is frequently practised in Leicestershire, and many other counties. It is of a warm nature, therefore it does most good on cold, moist, clayey soils.

and gives nourishment to the grafs; it kills the noxious insects that infest the crop, and protects it from the effects of frosts, snows, and chilling rains; and, what is still of greater consequence, it will kill the moss that so often abounds in four meadows †.

I must not, however, fail noticing, that foot will not have these good effects if the meadow land should be so damp as to require draining: in this case cuts must be made across it, in proper directions, previous to the laying on the coal-foot, which would otherwise be of little service.

All rank weeds should be carefully grubbed up from among the grafs, and that before they have perfected their seeds; without which precaution, in point of time, the work would be to do over again.

The general quantity I lay on an acre of meadow land is twenty five loose bushels; more I find to be rather prejudicial, and less does not answer all the purposes we are to expect from this excellent manure.

The best time for applying this dressing, I take to be the beginning of the spring: about February is the time I generally lay it on*; the gentle rains which then, for the most part, ensue, wash it in to the land, and the following crop is greatly benefited by it. This is very soon visible from the fine deep verdure which the grafs assumes.

Some of my meadow land is particularly subject to be damaged by frosts, snows, &c. On this I generally lay the proper quantity

† The winter is the proper season for sowing foot on meadow ground.

* We have already mentioned we think it best done in winter, and that for this reason, viz. that the first rains after the frost breaks will wash it in to the land, and warm and cherish the roots of the grafs; whereas when it is laid on in the spring, it may by its great heat affect the blade and heart of the grafs, and for a time at least, stop the progress of its vegetation.

quantity of foot in the beginning of November ; and sometimes, if the winter is likely to be severe, I venture to allow thirty bushels to an acre, which in other cases I never do.

I have, by experience, found coal-ashes and foot a most excellent manure for clover, as it secures this crop from drought, and brings it greatly forward.

I generally sow on my second year's crop of clover as much foot as will cover the land very thinly over, which is about fifteen bushels ; and this I do in the month of February, soon after which the spring rains wash it in to the ground, and the plant thrives amazingly.

The same may be said of coal-ashes, which I lay on thicker, to the quantity of, at least, forty bushels on an acre ; from which I find a great advantage.

The farmer who attempts to sow foot over his clover, must take care to do it very thin and regular ; for if it falls in lumps, it is ten to one but it gives the hay, made that summer, a bitter, disagreeable taste, very unpalatable to the cattle which eat it.

I have often found it useful, on my stiffer loam, to sow with the foot an equal quantity of sand, which helps to spread it regularly ; and on light land I often mix it with an equal quantity of flaked lime, both which have a very good effect.

Having myself found great benefit by using this coal-foot I am willing my brother farmers should know it, that they may have it at their option to adopt the practice if they approve of it.

It will be very well worth their while, provided they can have it at a reasonable rate, which they may, above twenty miles from London, by land-carriage, and wherever there is a communication by water, though at almost ever so great a distance.

Other great towns also, where sea or pit coal is burnt, may supply the farmers with it ; but the misfortune is, that where it is in the greatest plenty, they least know the use of it.

Great

Great care, however, should be taken to get it genuine and good, the *merchant chimney-sweeper* frequently, to encrease the bulk, mixing fine sifted coal-ashes with it; this is a great fraud, but may easily enough, with proper care and circumspection, be discovered; for the ashes make the foot gritty, and encrease its weight in a very sensible degree.

Before I conclude this letter, I must give my brother farmers a caution; which is, that they never lay the foot on land in windy weather, as not only great part of it will be lost and wasted, but the remainder will be so unequally disposed as to do rather more harm than good.

Should any thing else occur to my recollection, which may be of service to the lovers of agriculture, and proper to be inserted in your collection, I shall not fail communicating it to you, being firmly of opinion that I shall thereby merit something of my country; and, indeed, I sincerely wish this same motive would prompt every one, capable of doing it with propriety, to write you the result of their experience, in the subjects of which your work is to consist.

ARTICLE XVII.

Method of burning Clay, and the benefit of it as a Manure.

[From the *MUSEUM RUSTICUM*, Vol. I.]

AS you seem desirous of having an account of whatever may be advantageous to the public, I have transmitted you one of a manure, which I found very beneficial; which you may either publish, or not, as you think proper.

I observed our lands, (for I then lived in a wet clay country) after having borne three crops of corn, which is the common method of husbandry in those parts, produced good quantities of grass for two or three years; after which the ground

ground began to *fadden*, and then the produce diminished, and rushes grew in abundance.

This led me to think, that whatever would contribute to keep the particles disunited would be of great service; and, further I imagined, that clay or soil burnt would never reunite; which proved a fact: moreover, that the salt it gained by passing through the fire would enrich the land, which appeared from its produce when *denshired**; though I never approved of that husbandry, as the soil was thereby diminished, which is already too thin in that country. This determined me to attempt burning clay, which I did in the manner following.

I caused a labourer to dig as much clay as made a number of walls of nine inches high, and of the same thickness, and the same distance from each other, in a parallel direction, as would make about a square of three yards: these vacancies, being like tunnels of brick-kilns, I filled with brushwood, and on that threw some cinders, or small coal, of which I had sufficient quantities, then living nigh some coalleries; after which I covered the whole square with clay about three inches thick, leaving the ends of the tunnels open, which I then lighted on the windward side: as soon as the fire had got sufficient head, I stopt the mouths of them; and when I perceived the covering was almost burnt through, I had a small sprinkling of cinders, or small coal, thrown on the heap, and then another covering of clay of the same thickness; and thus I went on till my fire was seven or eight feet high.

When I found my fire was very well kindled, which was commonly about the time I put my second coat on, I used to enlarge the base of the fire, by continuing the tunnels, and by adding new ones to the sides, (which were filled and covered

* *Denshiring*, or burnbaiting, can very seldom be practised without injuring land, unless the soil happens to be very deep, so that it may be renewed by deep plowing.

vered as the others, and then lighted) till I made my fire about seven yards square; for I soon found it never burnt well in the middle, if it was so large at first.

Care should be taken the labourer does not put on too thick a coat at once, as it will be apt to smother the fire: besides, by confining the heat in too much, the clay was apt to run and vitrefy, which was then of little use.

As soon as the heap was sufficiently cool (for the sooner it is laid on the land the better) I put about ten large cart-loads on a statute acre, and found it an admirable manure for either meadow, pasture, or corn: for the latter it will not last more than three crops, though longer for the two former; and with this I have made prodigious improvements; but I don't believe it will answer for a sandy soil, as it will render it still lighter *.

This manure I burnt all times of the year, though slower in the winter than summer, but always fastest in windy weather †.

This, I fancy, may be burnt with brush-wood, or furze only, which I apprehend may answer better between the coats than coal, as it will keep the clay more open.

A R T.

* It is very certain, that burnt clay, used as a manure, makes land lighter, by disuniting the particles, before possibly too compact; it therefore stands to reason, that it is not so proper for light porous soils: this manure also warms and invigorates land, raising in it a slight fermentation, thereby disposing it to part with its vegetative virtues.

† There cannot be a better or more simple method of burning clay than that used by our correspondent: as such we therefore recommend it to our readers.

ARTICLE XVIII.

Of the cheapest way of manuring Land.

[From YOUNG's Rural Oeconomy]

THERE are so very few farms situated on soils that are rich enough to need no manuring, that the enquiry what manure is cheapest, is certainly one of consequence. It may be laid down almost as a maxim, that there is no farming without manure, and that in plenty too; for the difference is so very great between the crops from land that is in good heart, and those from a poor exhausted soil, that the comparison is almost beyond calculation. It should never be forgotten, that the expence of cultivation is the same upon the latter as the former. Plowing, harrowing, seed, sowing, rolling, water-furrowing, reaping, harvesting, and carting, when these are the same upon a field that yields two quarters per acre, as upon another that yields five; what prodigiously superior profit must arise from one, over what is received from the other.

But the necessity of thorough manuring may, in part, be gathered from the practice of all good husbandmen, from the earliest account of time. Now, common farmers are in no circumstance apt to be spirited, unless the profit has nothing equivocal in it; and we find them, throughout the kingdom, very anxious in procuring manure: however faulty and short-sighted they may be in some respects concerning its management, one cannot object to them a false idea of its importance; but a too great eagerness to gain the benefit of it in a number of successive crops. The grand dispute, in this matter, is the method of procuring manure, the variations of which are extremely great; different almost in every situation. The present point is not therefore to treat of every practice,

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which would require a volume, but to sketch them in general, with a few remarks on the means of supplying the capital articles, where they are not to be had.

Marle may be called the prince of manures; both for the degree of fertility which it occasions, the time it lasts, and the lowness of the expence. In those countries where it is most profitably used, a manuring with marle that lasts good twenty years, costs from fifty shillings to four pounds four shillings, which is surprisngly cheap. Supposing the price four pounds, it is just four shillings per acre per annum; which may be called one plowing a year. Now, let the writers on the new Husbandry consider this state of the case, and reflect, whether their system of manuring be reasonable or not. Monsieur Duhamel, or Monsieur du Chateauvieux, I forget which, advises the countryman, when he is about to manure his land, to calculate the expence of it, and lay out the sum in tillage; assuring him that the latter will pay him much better than the former. Praising one part of good husbandry in exclusion of another, is the absurdity of those only who give in to the hypothetical rage of system, which is alone sufficient to darken and perplex the clearest minds. Tillage and manure are both absolutely necessary; and that, perhaps, in proportion to each other; for manure, from its vegetative power, makes the seeds of weeds to sprout so quickly, that unless excellent tillage be given, the soil can never be clean. But to think, that one or two plowings annually can possibly equal the benefit of marle, is an evident absurdity.

Clay is, I apprehend, in no respect equal to marle, except the duration of the benefit received from it: the degree of fertility it confers, is not comparable to that of marle; but a very good clay may certainly equal, and has been found to exceed an indifferent marle; the expence is the same.

Chalk is used in many parts of England with a success equal to that of any marle under the sun; but it is very observable, that wherever this manure is so very excellent, it is universal-ly

ly the fat, soft, soapy kind : quere, therefore, whether that fort and marle be not the same thing under different names ? The expence of this manure varies like that of marle : It lasts as long.

Lime, I apprehend, is the most common and general manure of any that is used in England. It is so much valued in many parts of the kingdom, that the farmers think no management will do without it : But it is very observable, that we experimentally know little of its real utility. The few trials that have been published on it, prove rather against it. It is said to be much of that nature which is requisite for assisting the earth in yielding its fertility, but gives no increase.

However, but little is well known concerning it : upon some soils there can be no doubt of its being exceedingly beneficial, particularly the black moory, peat earths, and boggy lands ; and this seems to prove the justness of the above mentioned observation, for these soils certainly abound much in vegetative virtue, but are greatly in want of being enabled to exert it. The expence of liming, in various parts, is so extremely different, that it is impossible even to sketch any thing like a medium. It rises from ten shillings to ten pounds. Lime no where lasts long ; two or three years, and, in many places, only one, are the common duration of the benefit.

Dungs of all kinds are much affected, and with great reason, by the farmers. The general method is to fodder the straw of the crop in a yard adjoining the barns, where all sorts are collected together, forming a compost, the chief part of which is rotten straw : the benefit every one finds from it is very great ; but in the quantities commonly used, viz from ten to thirty loads, the fertility it occasions does not last long ; it is a common notion that land should be manured with it every three years ; in some places four. The expence is difficult to calculate, as it costs the farmer nothing but carriage, and perhaps turning over.

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In the neighbourhood of many cities and towns, farmers buy all sorts of stuff they can get; but this is by no means so general as it ought.

It is not my present business to give a complete catalogue of manures, I would only sketch a few of the principal by way of a guide to direct in the consideration of some that I shall propose. I therefore pass over, without mention, a number that are not material in that light.

There are many situations that either cannot command marle, chalk, clay, lime; or they are upon such soils as they do not agree with; in such places, we generally see the farmers confine themselves to their yard dung, or to the folding their sheep, if it is the custom of the country: unless they are near a town that affords much manure, and it is common to purchase it.

Such a situation is unfavourable to husbandry, and a good farmer ought to contrive some method or other for remedying such an evil. The grand one which I shall in this case recommend, is the keeping a great stock of cattle, and the purchasing as much straw and stubble as possible: And this method of raising manure is, I am confident, the cheapest that can in many places be practised. But the general idea is very contrary in so much that nothing is more common (and indeed the more favourable to such cultivators as have the spirit to act differently) than to see the farmers selling their straw to whoever will buy it. This certainly shews a very false notion, but I do not think it proves against the proposition: For it is to be observed, that few farmers keep half the cattle they ought, and consequently many of them cannot convert their straw into manure with any profit, consequently they are obliged to sell it; and this is so often the case, that I doubt not but the practice is often thought the result of choice, when it is the mere effect of necessity. This is one of the many blessed effects of their overstocking themselves with land; until they cannot afford to buy cattle, even to convert their own
straw

straw into manure. There cannot be a more fatal error, or one that is more likely to end in a farmer's ruin. It is much like letting their flocks of sheep out for their neighbours to fold at so much per week, which is practised in some places, and I doubt not but in others they sell their yard dung.

A quantity of straw turns with a good many cattle to much more dung than many would at first imagine. I have found by experiment, that twenty-seven head of cattle will convert sixty five loads of straw and hawlm (besides what they eat of it) into about three hundred loads of dung.

Hawlm, or wheat stubble, fold for six shillings or seven shillings a load, and straw, at an average of all sorts and seasons, at about twelve shillings. Each of the above sixty-five loads made about three and one half of dung. Horses well littered yield from twelve to seventeen loads of dung per horse. Five loads of straw, and four of stubble, were converted by eighty eight fat hogs into ninety loads of very rotten dung.

But they had not litter enough; they would have made twelve or fifteen loads into manure. As it was, the straw made ten loads for one. I have found in these, and other proportions, that the manure is excellent; but that from the hogs much the best.

Let us now calculate the expence of manuring in this manner. We must calculate, that the cattle in the yard eat none of the straw, because what they eat should be carried to the account of their nourishment, and not that of manure: this matter will be stated plainly, if we calculate the dung as five to one. The loads of dung, cart loads of forty bushels, and those of straw, large waggon loads.

One hundred loads of straw will make five hundred of dung: the expences will be as follows.

100 loads of straw, at 12 s.	-	l.	s.	d.
		60	0	0
Carting 250 loads of ant or mole hills, turf, virgin-earth, * &c. &c. into farm-yard, at 3 d. a load digging, or five shillings a score, and 7 s. a score or day for the team, 12 s. a score	- - - - -	7	10	0
Mixing 250 loads of earth with 500 of dung: 750 at 1 d.	- - - - -	3	2	6
Re-carting the compost on to the land, and spreading it, at 3 s. a score or day, and 7 s. the team,	- - - - -	18	15	0
		£. 89 7 6		

This is about 2 s. 4 d. per load, spread on the land: but it is observable, I have charged the teams at 1 s. per horse, carts, and man, which is what they may be hired for in most countries: and much beyond what they cost the farmers.

This circumstance will near, if not quite, reduce it to 2 s. per load; but whether it is called 2 s. 2 s. 2 d. or 2 s. 4 d. is no great matter, for all are surprisngly cheap. Twenty loads per acre of this compost come but to L. 2, and the benefit may certainly be calculated at four years duration in great heart. I should choose to renew at the end of four years; but the land would, beyond a doubt, be perpetually on the increase of fertility. The expence is therefore ten shillings per acre per annum.

Marle was found to be 4 s. per acre for 20 years duration. At first sight this may appear to be vastly cheaper than the dung; but nothing is more true than the contrary. For three years after marling, the benefit is not so considerable as when the marle is become well mixed with the soil. The first year it

* Chalk is excellent for this use; and marle better still.

is nothing; the second it begins to come in to play; the third a benefit is found from it, though not equal to the fourth, fifth, &c. and the five last years of the twenty the effect is nearly worn out. The soil may always be the better for it, but nothing comparable the last five years to the preceeding. It holds, therefore, in great vigour twelve years. This circumstance adds not a little to the 4 s. per acre. But farther:

It is to be much questioned, whether marle, in its best state, any where yeilds an increase of product equal to that which such a manuring of dung, as I have mentioned, will occasion. There are soils wherein it would undoubtedly beat the dung, if the latter was tried on the same; for instance, light sands. But that comparison would be useless; the dung is proposed as a succedaneum to those manures which cannot be had in any plenty: that is, for the use of farmers who have neither marle, chalk, or lime, viz, those in general who occupy loams and clays.

Upon such soils five manurings of my dung compost, each 20 loads, or 100 in the 20 years, will, I am confident, infinitely exceed the marle on any soil whatever. With proper management, of not cross-cropping, such a manuring will make a loam yield, upon an average of the 20 years, from five to six quarters per acre of all sorts of corn: which marle will never near equal in the best 10 years of its 20. Land so manured with dung wants no other manuring; but the finest marled lands require every now and then a manuring of dung, ashes, oil-cake, &c. &c. which, if it was added to the first expence, would raise it much; but the benefit is calculated on the supposition: indeed I know of no country where the farmers trust solely to their marle. The sheep-fold is another instance of advantage they have, which the dunged soil is not supposed to enjoy, because upon such soils the farms are, in general, too small for a fold.

It is from these considerations, or rather facts, that I venture to pronounce the method here proposed to be cheaper
than

than even marle, which has always been reckoned the cheapest of all manures. But there remains another way to calculate it: I before supposed straw to be bought; but stubble is much cheaper, and to be had, in most places, in much greater quantities.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
100 loads of stubble, at 7 <i>s.</i>	35	0	0
Carting as before	7	10	0
Mixing ditto	3	2	6
Re-carting ditto	18	15	0
	<u>£ 64</u>	<u>7</u>	<u>6</u>

This does not amount to 1 *s.* 9 *d.* a load, notwithstanding the teams are charged at a hiring price. A farmer, I am confident, would manage to reduce this to 1 *s.* 6 *d.* But whether he did or not, it is plain the expence of the manuring is vastly reduced from the preceeding calculation; and consequently, the remarks made on that, are much stronger with respect to this case.

I shall, in the next place, calculate the expence when the manure is made by fatting of hogs.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
100 loads of stubble, as before	35	0	0
Carting 500 loads of earth to the hog-yard, as before	15	0	0
Mixing 1500 loads, at 1 <i>d.</i>	6	5	0
Re-carting the compost on to the land, &c. as before	37	10	0
	<u>£ 93</u>	<u>15</u>	<u>0</u>

This

This is exactly 1 s. 3 d. per load, and the teams charged at the hiring price, as before. It is needless to remark, that the expence would, in practice, be much reduced. Twenty loads per acre of this excellent compost would cost no more than 25 s. I may fairly venture to pronounce it the cheapest of all methods of manuring land.

It is to be remarked, that where young ling, fern, brakes, &c. &c. are to be procured in large quantities, they may be in part substituted in the room of stubble; but the latter deserves more account for its general plenty; and particularly as the method of converting it to any use is unknown, I apprehend, in three fourths of the kingdom; in which parts the farmers would most readily sell it by the acre extremely cheap, an opportunity almost invaluable to those who have the sense and penetration to purchase all they can, and is, beyond a doubt, the quickest, and cheapest, and best method of improving poor soils, and carrying good ones to the highest point of fertility.

But for executing plans of this sort, great stocks of cattle are requisite; hence the truth of the remark I have so often made, that without plenty of cattle there can be no good husbandry. If a man comes to a farm much worn out and damaged by bad management, he ought certainly to convert the chief of it to producing cabbages, turnips, carrots, potatoes, &c. &c. and as fast as he got any part of it by their means into good heart, to lay down large quantities with artificial grasses; by which means he will be able to keep great stocks of cattle; and this again will enable him profitably to purchase straw and stubble of his neighbours; a train of management that will inevitably bring all his farm into most excellent order and fertility; and when ever he thinks proper to sow corn, ensure him from one acre, as much as his predecessors gained from ten

The bringing manures from neighbouring cities and towns, is an excellent custom; but, in respect of cheapness, is not to

be named with that I have just sketched. Two shillings and sixpence a cart load, or five shillings a waggon load, are common prices of dung, &c. &c. And for foot, ashes, malt-dust, woolen-rages, bones, &c. the price is exceedingly high; it is true, the quantity of the latter spread on an acre is small; but yet all of them are well known to be dear manures, and, at one mention, plainly more expensive than those which I have sketched. Hog dung, clear of all mixture, may be had for 1 s. 6 d. a load, by buying stubble, and as good as for 2 s. 6 d. bought in a town, besides all the expences of carriage.

From the considerations, therefore, which have occurred to me, as well as from my own practice, I have the greatest reason to believe, that buying straw or stubble to litter great flocks of cattle, much the cheapest and most effectual way of manuring land.

ARTICLE XIX.

On the Utility of a general Survey of the present state of Agriculture in every County in this Kingdom.

The Editors of this work entertained very sanguine hopes, that what was said in their Introduction concerning the advantages to be reaped from a comparative view of the state of agriculture in the different counties of Scotland, [Vol. I. Introd. p. 6. & 25.] would have created a more general correspondence from the persons of that profession in the different corners of the country. Some of their friends, convinced of that utility, have taken the hint, and have communicated several very valuable pieces respecting the management in their neighbourhood: for which they return their hearty and sincere thanks, and will ever be proud of such correspondents, when they shall be pleased to honour them in that way. The extent of that correspondence has not however been so general, as, from the great advantages that

would result from it, might have been expected. We are happy however to think, that this has proceeded more from the inattention of those who should communicate that knowledge, than from any belief or conviction, that what we requested would contribute nothing to the general good. But that we may not be partial to ourselves, or our own conceits, we beg leave to lay before our readers the following essay, which strongly enforces what we have advanced on this head. The instances of mistaken management in the agriculture in England, from Mr Young's Tour, may convince the farmers of this country, that however much they may be satisfied with their own management and oeconomy, or that of their neighbourhood; yet, were the different practices in different corners to be faithfully laid before them, few but would find something to amend or alter.

[From De Re Rustica.]

THE *Six Weeks Tour through the southern counties of England and Wales*, is one of the most useful pieces for improving and promoting agriculture that I have ever met with. It is written by the author of the *Farmer's Letters*. Who he is, is quite immaterial, since it is certain he is a man of letters and much reading.

I know not any thing that would contribute more to establish in this country a sound system of agriculture, and raise the nation to the highest pitch of glory, than two or three men of liberal education and knowledge of husbandry being appointed, at the public expence, to take a survey of the present state of agriculture in every county in this kingdom.

They should examine into, and lay before the public, an account of the nature of the soil in the different parts of each county; take drawings of the several implements now in use over the kingdom, both the old and those of modern invention; particularly describe the use of each, point out their advantages and defects, and of those in particular that are used

in

in draught ; they should add, what number of horses or oxen are employed for the purpose, and what number appear to be necessary. They should also give an account of the several sorts of grain and plants now cultivated in each county, with the method and course in which they are cultivated, remarking what particular grain and plant each county seems most adapted to ; they should likewise enquire into the heaths, wastes, commons, and common fields ; also into the woods, and what state they are in as to timber. And in regard to the heaths, wastes, and commons, they should give an account of what each is particularly adapted to, under a state of improvement, with the quantity of acres each contains.

They should also examine into the present state of the roads, both public and parish, point out what new roads, and what improvements and amendments are necessary. They should likewise particularly examine into the improvements now going forward, under the late acts for the several inclosures, within the last ten or fifteen years, giving an account of the methods pursued in each county, the expence and manner of laying out the land and inclosing it, with the success that has hitherto attended, or seems likely to attend such improvements, and the particular local consequences of these several acts for inclosing.

A work of this kind would be attended with no great difficulty, nor would it require any great length of time : One or two years would compleat it, and perhaps nothing would contribute more to immortalize the reign of GEORGE the Third, than his patronizing this great and valuable undertaking.

If we could once see a well-adapted, sound system of husbandry practised through this kingdom, not only in the present cultivated, but also now uncultivated lands ; we need no longer stand in fear of any of our neighbours : on the contrary, we should certainly become the greatest people in Europe, and the granary to all.

France

France had once a minister who would soon have caught my flying thoughts. I would *We* had such an one at this time ! That great man turned his chief attention to agriculture : he looked upon it, to the nation, as the foundation of its power ; the support of its grandeur, and the true source of the people's happiness.

He stated the value of the provinces in proportion to the plenty which each yielded, and he preferred such riches to conquest, which creates resentment and jealousy. "Plenty," said he, renders neighbouring nations dependent on us, "since we can refuse or consent to supply their wants. The productions of the earth cannot be carried off, but to the profit of the owner, in the way of trade ; but arts and manufactures may, with the artist and manufacturer, be carried to any other country in the world."

The knowledge of the oeconomic government of a kingdom was, in the opinion of this great man, the true science of a statesman, since it gave birth to, and increased the wealth of the nation. "The inattention of the people," said he, in not cultivating their waste lands, must be got the better of ; but it must be done by precept, and their concurrence must be gained by encouragements." The truly great master of this excellent minister seconded all his wise extensive views, and, in the spirit of true patriotism, he estimated the men of landed estates, who *sauntered* about his court, to the detriment of their own affairs, and the manifest hurt of their country.

However, not to wander too far for matter to illustrate my subject, I shall now, in some respect, shew the necessity of such an examination as I have recommended, into our present system of husbandry through the kingdom, by laying before you, from the *Six Weeks Tour*, the author's account of plowing, from the east to the west side of the island.

"The variations in the manner of tillage were extremely great, and form an instance of as mistaken management as
"any

" any I met with. This will appear very evident, from the
" following table of soils, and quantity plowed in a day.

" Improved parts of Northfolk.

" Light turnip land :

" 2 Horses,

" 2 Acres.

" Across Suffolk and to Braintree in Essex.

" Light, loamy, and some heavy bean land :

" 2 Horses,

" 1 Acre.

" At Lord Clare's in Essex.

" Loam too heavy for turnips :

" 2 Oxen,

" 1 Acre.

" Between Braintree and Chelmsford.

" Mixed soils, both light and heavy ; turnips and beans :

" 3 Horses, sometimes four,

" 1 Acre.

" Between Acton in Uxbridge, Middlesex.

" Both light and heavy ; turnip and bean-land :

" 4 Horses in a line,

" 1 Acre.

" Around Wycomb, in Buckinghamshire.

" Light soil ; bears good turnips :

" Five Horses, often six,

" From $\frac{1}{2}$ to 1 acre.

" About Stock Church, in Oxfordshire.

" Chalky soil :

" 6 Horses,

" 1 Acre.

" Near Sherborn, on Cotswould-hills, Gloucestershire.

" Light, but chalky and poor :

" 4 Horses,

" 1 Acre.

" From

- " From North Leach, through Gloucestershire, Monmouth-
" shire, and Glamorganshire.
- " Light and middling turnip-land, &c.
" Eight oxen; never less than six; or four, and
" two horses.
- " From $\frac{1}{2}$ to 1 acre.
- " Between the Devises and Salisbury.
- " Light and middling; great quantities of turnips:
" 4 Horses, never less than three,
" Scarce one acre.
- " In the neighbourhood of Salisbury.
- " Various soils, but in general light:
" 3 and 5 Horses,
" 1 Acre.
- " Through Hampshire.
- " Light dry soil in general:
" 4 Horses,
" 1 Acre.
- " Between Gunford and Cobham in Surry.
- " Much land; and light loam:
" 4 Horses, and often more,
" 4, 6, and 8 Oxen,
" $1\frac{1}{2}$ Acre, light soil,
" 1 Acre heavy.
- " About Ilford, Essex.
- " Gravel,
" 2 Horses,
" 1 Acre."

It is certainly very evident, from this account, that a great number of cattle are kept to no purpose, and that the keeping of them is not only a private, but a public misfortune; since the land employed to maintain them might be applied much more profitably to the farmer and the nation. This matter therefore cries aloud for public examination, and if the London

don Society was on that solid, united footing, which many gentlemen wish it was, I should be tempted to lay before them a hint, recommending the procuring, not a model, but an actual plough; I mean every different plough used through England *: When this was done, I would have a meeting called of mechanical gentlemen and actual mechanics, when, it is very possible, a plough might soon be produced, which might be yet more adapted to answer the purposes required of a plough than any now in use, the requisites of a plough being easy entrance, steadiness, compleat subversion, and least resistance or draught.

* The best known plough at present is the Rotherham, or patent plough. This plough, with a pair of horses, without a driver, the reins answering the purpose, will, with ease to the horses, plow an acre a day, in all arable land, light or stiff: and we have great pleasure in being able, upon enquiry, to inform our readers in the neighbourhood of London, that this plough is made, in a compleat manner by, K. Edwards, wheel-wright, near the Plough, at Clapham, in Surry.

T H E
SCOTS FARMER,

JANUARY 1774.

A R T I C L E X X .

Of the Culture of Barley—Of the Culture of Oats:

[Dickson's Agriculture Vol. II.]

BARLEY is the grain next in value to wheat. There are three different kinds of it used in Scotland : The common barley, the Lincolnshire barley, and the Highland barley, commonly called Rough Bear. There is another kind lately introduced, called the Thanet barley. This last is very little different from the common barley in appearance ; the stalk is stronger, and it is not so easily lodged. This makes it very proper to be used when grass-seeds are sown ; for the grass is often damaged by the lodging of the corn. Neither is the Lincolnshire barley much different in appearance from the common barley. The grain in the ear is set closer together, and more horizontal than the common barley. It is likewise stronger in the stalk, a hardier plant, and much longer in ripening. The rough bear is different from the others. It is sooner ready than the common barley ; and, instead of two rows of grain in the ear as the others have, it has six, the grain very wide set. It is uncertain whether these are originally of a different species, or whether it is the difference of climate, soil, and culture, that has made them different. It is certain, that when rough bear is brought to a part of the country where barley is commonly sown, after being sown for a few years it is turned into barley. But this is no evidence

of its being originally the same species, as appears from what was observed of the different kinds of wheat. It is probable, that the Lincolnshire barley, and common barley, are the same species, as it is observed that the oftner that the Lincolnshire barley is sown in this country, it approaches nearer to the common barley in the time of its ripening.

These different kinds of barley are sown at different seasons. The Lincolnshire barley may be sown any time during the winter, or in the spring: The common barley and Thanet may be sown in April, or in the beginning of May, or even later; and the rough bear may be sown in May, or even the beginning of June.

The precise time of sowing should be determined by the weather and situation of the land. If the season is favourable, the land in a proper situation, free from weeds, and not too wet, Lincolnshire barley may be sown in February. But if the season is unfavourable, and the land wet, it ought not to be sown till the season is farther advanced: For either plowing, or harrowing land when wet, is very hurtful, and endangers the crop.

If the season is favourable, and the land free from weeds, the other kinds of barley may be sown sooner in the season than the time mentioned; but if the season is unfavourable, or the land infested with weeds, the sowing these should be delayed as long as possible. When land is infested with weeds of any kind, the farther that the season is advanced before the barley is sown, the less hurt the weeds do to the crop. In proportion as the sowing the seed is late, the greater number of weeds spring before the seed-furrow, by which they are destroyed, and the weeds that grow afterwards are the farther removed from their proper season, and are thereby prevented from becoming vigorous. The further too that the season is advanced, the seed springs up the sooner, and thereby the more effectually gets the better of its adversaries and the land being drier when plowed, the greater number of the

roots

roots of the quickening grafs may be got out, or destroyed.

When barley is fown in winter, or early in fpring, the land may be plowed fome time before ; but if it is fown late in fpring, or in fummer, it ought to be fown immediately after the plough. In winter, or early in fpring, land is not in danger of becoming too dry, and therefore there is no need to be careful to preserve the fap to make the feed vegetate. But in fummer, land is apt to become too dry for the purpofes of vegetation ; and therefore the method of plowing and fowing at that feafon, that ferves beft to preserve the fap, is the moft proper. Either plowing in the feed, or fowing the land as foon as it is plowed, ferve this purpofe beft. It is evident that plowing in dry weather makes the land drier ; for the dry furface is turned down, and a moift furface expofed, which foon becomes dry likewise ; befides, the land is rendered opener, and more uneven, and thereby it is more expofed to the influence of the winds, and more eafily penetrated by them. Hence then, if land is allowed to remain for fome time after it is plowed before it can be fown, it dries very faft in that time ; and the harrowing, though it puts the land in a fituation to retain the fap, yet is a means of exhausting it while the work is performing, and for fome fhort time after ; for it changes the furface, turns down a dry furface, and turns up one that is moift. But if the land is harrowed immediately after plowing, it retains the fap, and very little is loft in the harrowing ; for though the furface is changed, yet the one turned down, and the other brought up, are almoft of the fame kind, as the furface turned up by the plough has not had time to dry.

When the fowing of the barley is delayed till it is late in the feafon, fometimes the land, notwithstanding all the care that can be taken, becomes fo dry that the feed has not fap enough to make it vegetate. The farmer, therefore, fhould endeavour to have all the feed fown before the feafon is too far

far advanced : And in order to this, he should manage his matters in such a manner, as to have some of the breaks, designed for barley, in such a situation as to be sown safely with the Lincolnshire barley, or early in the season with the common barley.

The quantity of barley sown upon an acre is from two to four firlots. The situation of the land, as has already been observed in the case of wheat, should determine the precise quantity. When the land is clean and rich, two firlots are sufficient ; but when the land is infested with weeds, a larger quantity is necessary.

Barley is not a good forager : it has tender roots and is not very able to search for its food : Hence it becomes necessary to bring the land, upon which it is to be sown, into very good tilth : and to enlarge the vegetable pasture, either by manures or frequent plowings.

Barley is frequently sown upon land that has been fallowed, and frequently upon land after a crop of pease or wheat. In some places it is sown after a crop of oats ; and sometimes it is repeated for two or three years successively upon the same land.

When barley is to be sown upon fallow, the land stiff, and not much troubled with annual weeds, it should be dressed in the month of November, as if for wheat ; that so Lincolnshire barley may be sown if the winter is favourable, or spring barley upon the winter-furrow, if the season proves unfavourable. It is proper in every kind of land to dress the fallow in this manner ; but if the land is naturally rich, or the season mild and open, it is necessary to give it another plowing before the seed is sown.

When barley is to be sown after wheat, pease, or oats, the land should be plowed as soon after harvest as possible, and laid up in such a manner, as best to be exposed to the influence of the air and frost, and as best to be secured against receiving damage from rain.

In some places they rib the barley-land at this season, as the best method to answer these purposes. [Vol. I. p. 120, 430, 433.] But ribbing, though it may answer some of these purposes, yet it stirs but a small quantity of the soil; and therefore it is better to gather it into narrow ridges of four or six furrows each, and to make drains in all places necessary for conveying away the water. By these means the winter rain finds its way easily off, the land itself receives the greatest benefit from the air and frost, and it is the sooner in the spring in a proper condition for receiving another plowing. This first plowing which the barley-land receives, needs not be very deep, but ought to be as broad as the plough can do it, so as to be clean plowed. For as the design of this plowing is to cover the stubble, increase the vegetable food, and keep the land dry, the more uneven that the surface is made, and the broader that the land is plowed, it is the better exposed to the influence of the air; and the water finds its way off the more easily, [Vol. I. p. 334.]

If it is proposed to dung the barley-land, the dung may very conveniently be laid on during the winter frost, and plowed in as soon as the land is in a proper condition. Though there should be no frost to prevent plowing, as is sometimes the case; yet, if carts can go upon the land without danger, it is not improper to lay on the dung before the second plowing, or steering furrow, as it is commonly called. When the laying on of the dung is delayed till immediately before the last plowing, or seed-furrow, the land, if it is stiff in its nature, is in danger of being battered so as to rise in large clods when plowed; by this means the drought, common at that season, has easy access, and prevents the seed from striking root. Even though the land should be light, yet, if the dung to be laid on is not well rotten, it is apt to occasion such an hollowness or openness in the land, as to render the crop easily damaged by drought: But when the dung is laid on before steering, no such inconveniencies follow: For, though the land rise in clods when plowed, yet, at the season of this plowing,

plowing, there being sufficient sap to make the dung operate, a fermentation is raised ; and, in a short time, the land is made soft and mellow, and in a proper condition for being plowed, when it gets the seed-furrow. Though the dung may be rough when laid on, yet it is mixed, and made to incorporate with the soil by the two plowings, in such a manner as to give no particular advantage to the drought.

In steering, the plowing should be as deep as the plow can go, and the soil allows. Deep plowing is always proper in deep soil ; and, in giving the barley-land the steering-furrow, this can be done most conveniently, as the land is open by reason of the former plowing, and as it is always sufficiently moist at the season of giving this plowing. By deep plowing at this season, the mold, exposed to the air through the winter, is not buried so as not to be turned up by the shallow plowing given at the seed furrow, as perhaps may be imagined : For, in the ordinary plowing of this country, the earth of the furrow is only turned half over, so that when the barley-land is plowed deep at the steering-furrow, and this reversed by a shallow plowing at the seed-furrow, part of the earth that has lain exposed to the air through the winter, and part of the new soil turned up at the steering-furrow, are mixed together for the pasture and nourishment of the crop. In steering, the furrows should not be taken off so broad as at the former plowing ; on the contrary, the narrower they are the better. The chief design of steering is to enlarge the vegetable pasture, to encourage the growth of seed-weeds, and take out root-weeds. Now the deeper that land is plowed, these purposes are the better answered. If the land is so dry as to allow it, cross plowing is very proper at this season. By it the soil is better broke, and the harrows have greater influence in pulling out the roots. But, if this sort of plowing is thought dangerous, on account of the wetness of the land, two or three of the narrow ridges, made at the former plowing, may be turned into one ; or, if the ridges are of an ordinary breadth, they

they may be casten or cloven. On no aount they should be gathered, as thereby they would be raised too high, and in an improper situation for the kind of plowing which the land should receive at the seed furrow.

After steering, the land should be well harrowed. This makes the weeds spring, and retains the sap; and, if the land is tolerably dry, takes out the roots of the quickening-grass. When the land is in no great danger of losing the sap, it may lye for some time after it is plowed before it be harrowed; for by this a greater number of weeds are destroyed: But, if it is in danger of losing the sap, by which the vegetation of the weeds is prevented, it should be harrowed immediately after it is plowed; for by this the less quantity of sap is lost.

Though frequent plowings in the general are beneficial, yet it is certain that plowing, when the land is over-wet, is destructive. When the spring is wet, as it sometimes happens to be, the barley-land in many places is not in a proper condition for being plowed. In this case the steering furrow must be omitted, and the land, as soon as it is in a proper situation, should get the seed-furrow. When barley-land is steered wet, it is in a worse condition when it gets the seed-furrow, than if the steering-furrow had been omitted; and it is so whether the after-season is wet or dry. If the season is wet, the land receives and retains more of the water than if it had remained unplowed. When land has remained untouched during the winter, though it may have been plowed immediately before, yet it acquires a degree of firmness that enables it to resist the rain, and make the water run off. But land newly plowed, especially if it is turned over with whole furrow, as is the case with almost all wet land, resists no water, it receives it all in the openings betwixt the whole furrows. If the season is dry, the wet plowed land dries too quickly, and thereby becomēs so hard that it is almost impossible, for some time, to break it into a proper mold: Whereas the unplowed land, though equally wet, yet not being so much exposed

posed to the influence of the winds and sun, does not dry so quickly, and hence does not become so hard. Suppose that the season is the most favourable, in the general dry, but the drought not violent, yet the land that has been plowed wet, so much as it dries, must dry faster than the unplowed land, and consequently be so much the harder.

When barley is to be sown a second time upon the same land, without any other crop intervening, and the land, before the first sowing, has got a sufficient number of plowings, two is sufficient for it the second time. The situation of the land must determine at what time the first plowing should be given, whether immediately after the harvest or in the spring. When land is so situated, as to make it uncertain, whether, even in a tolerable season, it shall be in a proper condition for being plowed in the spring, or when it is clean, and free from weeds, then it ought certainly to be plowed before winter; for this reason, that when land is plowed, it receives more benefit from the air than when it lies unplowed. But when it is in no danger of being in an improper situation for being plowed in the spring, and, at the same time, is infested with weeds, then the plowing should be delayed till that season. Nothing can be done after the autumn-plowing to destroy weeds, and when land lies so long untouched, as from the autumn to the time of making the barley-feed in the spring, the growth of the quickening-grass is greatly encouraged. But when land is plowed in the spring, the feed-weeds are encouraged to vegetate, and the roots of the quickening-grass may be pulled out. When the barley-land is to receive only two plowings, and has got the first in the autumn, it is proper to harrow it in the steering time. This in some measure answers the design of plowing in the destruction of weeds.

Though the laying on of dung, before the steering furrow, has been recommended, yet when the dung is compleatly rotten, and the land soft and light, the delaying this, till immediately before the feed-furrow, does rather better. The

going

going of the carts upon such land is an advantage; it makes it firm, and rise with a clod in the plowing. This, it is true, lessens the vegetable pasture for some time, but then it prevents the weeds from springing along with the barley, and gives the barley so much the advantage, as to prevent it from receiving any damage from them for that season; and the vegetable pasture, lessened by the going of the carts, is soon restored by the operation of the dung.

When land is stiff, and the laying on of dung has been delayed till after the steering-furrow, or when the land has been so wet as not to allow steering, the dung should be allowed to lie some time spread on the land before it is plowed in: For though some of the virtues of the dung may thereby be lost, yet, by its lying upon the land, it not only makes it retain the top, but also makes it soft and mellow on the surface, and in a more proper condition for receiving the seed furrow.

The seed-furrows needs not be very deep; for the roots of the barley go down but a short way; but it should be very narrow, so as the land may be as completely reduced as possible; for the more completely that the land is reduced, the larger is the vegetable pasture, and the more effectually is the top retained.

As our summers in Scotland are sometimes very rainy, when land is in danger of being damaged by water, after the barley is sown, it should be water-furrowed, and dressed up in the same manner as the wheat-land.

Of the culture of Oats.

The Oat is a very hardy plant and a good forager. By the strength of its roots it procures its food, where many other plants starve. Hence the practice of giving less culture to the oats than to any other grain.

There are three kinds of oats used in Scotland, the white, the black, and the grey. The white is the most common, and

used in all the low countries. The black is reckoned the hardiest plant of the two, and is used in the cold hilly countries; and the grey is, in some parts of the country, sown with success upon light gravel or sand. The white is divided into two particular kinds, called cold seed and hot seed. There is scarcely any difference in appearance betwixt these. The hot seed ripens eight or ten days before the other. It is commonly thought that these were of the same kind originally; but that the seed that has been often sown upon warm soil, and by it having been sooner brought to perfection, has at length had its nature changed, and become like the plant natural to such a soil. This we may easily believe, as we find the nature of animals, as well as other vegetables, undergoing greater changes than this, from habit. The place of the country, the most remarkable for this kind of oats is a light warm soil, and when they are taken to colder soils, and often sown, it is found that they degenerate, and are longer in ripening than at first.

Experience must determine, which of these is to be chosen for feed. Though the oat is a hardy plant, and does not easily degenerate, yet the changing of seed is universally by the farmers reckoned a good practice. This change, it is natural to suppose, should be made from warm soil to cold, and from cold to warm. When hot seed is brought to a cold soil, the sowing may be delayed for fourteen or fifteen days, which may be of very great importance, as, from the nature of the season, land in bad order for being sown with cold seed, may be in a very proper condition for being sown with hot seed. When cold seed is brought to a warm soil, a hardy plant is brought into a good climate and pasture, and it thrives accordingly.

Oats are often sown upon grass ground newly broken up, or, which is the same thing, upon lee once plowed: Often they are sown after barley, sometimes after wheat, sometimes upon fallow, and sometimes are repeated for several years successively upon the same land.

In plowing lee for oats, when the land is soft and mellow, the plough should go as shallow as possible, and set the earth of the furrow as exactly as possible upon its edges. For the

thinner

thinner that the turf or sward is taken off by the plough, and the more upright that it is set, the harrows make the greater impression, and tear it the more easily in pieces. If the ridges are steep, or high raised in the crowns, they ought to be cloven down; for if they are gathered or casten, it is improper to harrow across, lest the harrows turn back the turf instead of tearing it; and harrowing across is the most proper way to break the turf and reduce the land. But when the land is stiff, or the turf very tough, as it commonly is on poor or wet land, it is necessary to plow deeper, and to turn the turf fully over, that so the harrows may raise a kind of mold upon its back to fill up the hollows betwixt turfs, and to nourish the seed.

When oats are to be sown upon lee, the land should be plowed early in winter, that so it may receive the greater benefit from the air and frost, to destroy the grass-roots and to mellow the soil. When the lee is to be trenched, it ought likewise to be plowed early, that so the turf may have the longer time to rot before the seed is sown.

It is very common to lime the lee-ground that is intended for oats. This is a very good custom, for lime promotes the corrupting of the grass-roots, by which means the land is the sooner reduced.

When lee is limed, it is common to spread the lime upon the sward, sometime before the land is plowed. This is likewise a good custom; for the lime incorporating with the sward, is not so apt to fall to the bottom of the furrows, and penetrate down through the soil, as when it is plowed in, lying loose upon the surface.

In the ordinary schemes of management upon rich land, oats are sown after barley, whether the barley has been sown upon fallow, or after wheat, or after pease, and the land is plowed as soon as the wheat-feed is made, and the barley-land has got the first furrow. The stiff land, and the land in danger of being damaged by wetness, should be first plowed, the
one

one to have the benefit of the winter frost to mellow it, and the other to be put out of danger. It may be proper sometimes to plow some pieces of this kind before the barley-land gets the first furrow; but this must always be left to the judgment of the farmer, as many other things must be, about which it is not possible to give positive directions. It is likewise an advantage to light and dry land to be plowed early in the season, as this makes the stubble rot sooner, and exposes the soil to receive greater benefit from the air. But as these advantages that this kind of soil receives from being early plowed, are not so important as the advantages that stiff and wet soil receive from this, the plowing of light and dry land may therefore be more safely delayed till the spring.

In wet stiff lands when wheat is sown upon the fallow, and the fallow made very clean and well reduced, some farmers sow oats after the wheat. At the season of plowing the oat land, they find the land, that has carried a crop of wheat, much drier than the land that has carried a crop of barley; and upon the dry plowing of the oat-land in some measure depends the goodness of the crop. The nature of the culture and crop makes land after a crop of wheat, much firmer than after a crop of barley, and the firmness of the land, resists the rain and makes it run off. This practice, though not very common and generally condemned, may however be successful in lands in the situation mentioned.

On some barren lands that are at a distance from all foreign manures, no hing is sown but oats, and these are repeated several years successively. When this is done, and oats sown after oats, the land is managed in the same manner, as when they are sown after barley.

I observed, that oats are sometimes sown upon fallow. In the hilly countries, they often fallow the land that has been in lee for some years, and they find that this practice does better than giving it only one plowing in the winter before the seed is sown. In the low countries, even where the land

is tolerably good, this practice of fallowing for oats is found to succeed very well. Instead of cropping land till it is quite wore out, and then letting it lye for grafs, as was the general way of managing out-field land in Scotland, some farmers after bringing their out-field into tolerable order, take but a few crops, and then give it a fallowing. This sometimes occasions more fallow than they have dung for; and without dung, except upon very rich land, neither a good crop of wheat or barley, is to be expected. For which reason some farmers have been led to try oats upon the fallow without dung, which, generally speaking, succeeds very well. But then, as the oat is a good forager, it may be expected, that, when assisted by a fallow, it will search the soil very severely; and therefore when this is done, grafs-seeds should be sown along with the oats.

The fallow for oats should be managed through the summer in the same manner and with the same care as if for barley or wheat. Before winter it should get the last furrow and be laid up in proper ridges, so as to be kept dry during the winter, and to be proper for being sown in the spring.

Oats may be sown in any of the winter months, or in the month of March. Some persons have sown them so early as the beginning of November, and have had good crops. But, if the land can be laid up in such a manner as to be in a proper condition for being sown in the month of March, it is better to delay the sowing till that time. When land lyes smooth all winter, and is not plowed in the spring, root-weeds being so long undisturbed are greatly increased, and the land itself receives but little benefit from the air and winds. Whenever therefore the sowing of seed may be safely delayed till the spring, it ought not to be sown in winter; for if it is, neither so good a crop is to be expected, nor the land in so good a condition when the crop is taken off.

Of oats there are commonly sown upon an acre from four to five firlots. The situation of the land, as has been observed, —
when

when it is intended for wheat or barley, must determine the precise quantity

It is the general opinion that oats should get a dry bed. This opinion is well founded. There is no want of sap at the season when the oats are sown, and provided there is as much sap as to make the feed vegetate, the drier that the land is when the seed is sown, as has already been observed, it is in a situation so much the more proper. Though a certain quantity of water is necessary for carrying on the process of vegetation in every plant, yet when more of this is applied than is necessary, the plant suffers, and does not arrive at such perfection as otherwise it would do. Thus we find, that in wet summers the grain is never so good as in dry.

As there are often heavy rains after the sowing of the oats, it is necessary to water-furrow the land carefully, and otherwise manage it as if sown with wheat before the winter.

ARTICLE XXI.

THE FARMER'S KALENDAR

FEBRUARY.

BEANS.

IN this month, begin to sow your bean crop, and, if your soil and the season agree, finish if you can; for later sown crops will not succeed so well. The land ought to have been plowed into the three-foot ridge, and well water-furrowed the autumn before; by which means your only object now will be the seed earth: so that the first dry season may be taken for sowing. To get the bean crop in the land in February is an object of much consequence, if the soil is dry enough.

As to the methods of sowing, there are many. Some farmers sow the beans over the land, and plough them in; others plough first, and harrow in the seed; and these both on ridge and flat work. The best way of sowing is either to half plough the ridges, and sowing broad-cast, afterwards finish: or to sprain them by hand before the plough, so that they may rise in rows on the tops of the ridges. In the latter way, they are in single rows; but, in the former, double. In the following summer, the single rows are plowed between, in the horse-hoeing manner, and the double ones hand-hoed: both are common husbandry in several parts of the kingdom. But I shall recommend, in preference to them, using a drill plough at least for shedding the seed, as it executes that work with much greater accuracy, than any hand in the world can do. Light drills may be had to wheel along the ground, like a wheelbarrow. The use of such an instrument will save much money, at the same time that it performs the work much better than any other method. Besides these methods of sowing, in some parts they dibble in with an iron, which makes three, four, or six holes at once, by which means, a bushel does
for

for an acre of land, whereas if they are sown it requires twice or thrice that quantity. A Farmer, that has land proper for beans, should, on no account, avoid giving a particular attention to the crop; for it will prove one of his surest funds of profit. By means of beans, he may be able to banish the unprofitable custom of fallowing; for a crop of beans, rising in single rows on three feet ridges, or double rows at one foot on four feet ridges, gives so good an opportunity for plowing the intervals, and also admits hand-hoeing the rows, that the land may be cleaned as well as any fallow, and the crop succeeded by corn: but, if the soil is in such terrible order, that this culture is insufficient to clean it, then let a second crop of drilled beans succeed, which will be very profitable husbandry, and cannot fail of bringing it into garden order. Whenever beans are cultivated with this view of substituting them in the room of a fallow, let the farmer absolutely determine on drilling them, so as to admit the plough between the rows; for no hand work will clean and pulverize the land sufficiently for this purpose, at least without an expence too great for the object. If the spirited husbandman calculates the expence of summer fallow, and also the account of a drilled bean crop, he will find the necessity of this culture. Beans do very well on loams, and on lighter ones than commonly imagined; but on light gravels, sands, &c. more profitable crops may be substituted. Let the farmer remember the general maxim in his tillage for beans this month, never to allow his ploughs to stir while the land is wet: if his horses poach at all, or his ploughs do not go clean through the land, he will lose, or at least greatly damage his crop. Two bushels of seed *per* acre sown, and six pecks drilled in equally-distant rows, three feet asunder, are sufficient quantities.*

Pease.

† The bean and pease firloft is nearly the same with the English Winchester bushel, by the table of proportions, Vol. 1. p. 653. But the farmer must advert that the English acre is less than the Scots by about a fifth part, the English being to the Scots nearly as 435 to 547.

Pease.

This is also the season for sowing the hardy sorts of pease. The land should have been plowed in autumn, and again at sowing; if the soil is light and porous, turn them in by the plough; but on other lands it has been found more advantageous to plow first, and then harrow them in. A farmer, desirous of keeping his land always in good and clean order, should, in the arrangement of his crops, take great care not to be too free with wheat, barley, and oats, which are all exhausting plants: he should sow beans and pease enough, because they are enriching ones, and admit hand-hoeing to kill the weeds. In those fields in which the common husbandmen sow oats or barley, after wheat, or each other, let the good cultivator substitute pease or beans, or some other enriching crop, which will pay him better than corn, under such circumstances, and at the same time keep his land clean.

I must in general remark, on the culture of pease, that the farmers are too apt to sow this pulse when the land will yield nothing else. They have a proverb among them, which signifies, that the season does as much for pease as good husbandry; and they from thence take care, that good crops shall be owing to season alone. Hence arises the general idea of pease being the most uncertain crop of all others. All this is owing merely to their being scarcely ever sown on land that is in good order. I let the good husbandman lay it down as a maxim, that he should sow no crop on land that is not in good order: he should never sow oats, pease, or beans, on land, that is not in order for barley—not respecting the fine tilth at the time of sowing, but the soil's being in good heart, and clear of weeds. But I would not here be understood to rank all these crops together; because beans and pease will admit of cleaning while they grow, whereas corn will not, to any profit. So that, if a farmer comes to a field, which his predecessor has filled with weeds, a horse-hoed crop of beans will be expedient.

ent, when a barley crop would be utterly improper: and after land has yielded one crop of barley, certainly another should not be sown, but one of pulse substituted. If these ideas are well executed, the pease and beans, in every course, will find the land in heart enough for barley, the soil will always be clean, and the crop good. Pease, when managed in a spirited manner, will not have the reputation of being an uncertain crop, which character, I am persuaded, has been owing to the slovenly conduct of bad farmers.

Black Oats †.

This month is the proper season for sowing black oats: the land should be plowed first, and the seed harrowed in. Four bushels per acre are a proper proportion of seed, in rich soils; but five or six do better on poorer ones. They suit best on turf land plowed up in the winter, and left till this time for harrowing in, which is a profitable husbandry, as it finds employment for the ploughs throughout winter. The farmers usually sow them after other crops of corn, but that practice is always to be condemned: they likewise plow but once for them; on the contrary, I suppose the land to have been plowed in the preceeding autumn. They follow beans or pease properly or any ameliorating crop of roots, &c. Supposing the land too wet to plow, they cannot be sown this month; but, if your soil and the season will allow, never delay getting them into the ground: for early sowings of all hardy crops, when the land is dry enough, are of great importance, and many times more than sufficient to balance other very expensive circumstances.

Barley.

It is now a proper time to examine such of your turnip fields as are finished, whether drawn or fed on the land. If they will break up in a pretty crumbling, mellow state, it will be advisable

† See page 121 of this Volume.

adviseable to leave them till the next month, and then plow and sow; but, if you find that the land will not, with one plowing, be fine enough for this grain, then effectual care should be taken not to lose a dry season for giving it the first tillage this month, otherwise it will be sown too late.

Carrots.

This crop is of vast importance to the farmers, who have spirit enough to cultivate it. It is not merely book-husbandry, but actually common in some parts of this kingdom. March is the proper season for sowing it; but, on some soils, part of the preparation must be made this month. I suppose the land plowed as deep as possible in October: if, on examining it, there is any reason to expect it will be deficient in fineness on sowing, let it receive a common plowing, in dry weather, this month, which can scarcely fail of ensuring a good tilth the ensuing one. The soil proper for carrots being dry gravels, sands, or loams, you may probably be able to plough them this month. This tillage will not be necessary, if the land bids fair to work fine in March. Let me here remark further, that, in case the land is very mellow, and in good order enough to harrow on this month's tillage, you should by no means omit to sow upon this plowing, and harrow in the seed; for although March is the common season, yet the uncertainties of weather are such, that the state of the land, in most cases, requires a greater attention than the name of the month; and carrot seed, let the weather be ever so severe, will take no harm: It may be sown without danger in November; and, in case March turns out very wet, and your sowing is driven into April, it is twenty to one but the crop suffers.

Cabbages

The fields, designed for cabbages in April or May, and plowed in October on to the ridge, should this month, if the weather

weather will admit, receive an earth, reversing the ridges, but not stirring flat. This will have good effects in pulverizing the soil, which it may be supposed to want, as it consists only of stubbles turned up in autumn. This is a point that should be attended to; for cabbages are always to be considered as a fallow, in which light their importance must appear sufficiently great. As this tillage is the first that marks the land for the crop, (all stubbles being plowed in autumn, for whatever crops designed) it will be proper here to speak more particularly of the preparation and design of the culture.

Some late authors have published such extreme satisfactory experiments on cabbages, as food for cattle, that it would be unpardonable to pass over the article in this work. They are said to flourish to very great profit on all clays and good loams, and to have the particular property of enabling the farmers of clays and wet loams, to winter more cattle than those of lighter lands can affect, by means of that excellent root, the turnip. The great evil of clay farms used to be the want of green winter food; which confined them in their stocks to hay alone, and consequently prevented their reaping those extended articles of profit, that arise from numerous heads of cattle: and besides the immediate benefit from the cattle, they lost also the opportunity of raising large quantities of dung, which never can be effected so well as by keeping cattle in winter. But all these evils are by the cabbage culture remedied, and the clay farmers put in possession even of a superiority over the turnip ones. If the difference between a summer-fallow year on clay, and a turnip-fallow on light land, be considered, the importance of this new discovery will appear sufficiently clear. Thirty shillings an acre expence, of the first, is not an exaggerated calculation; but all is saved on the turnip land, perhaps with profit; and the barley, that follows the turnips, is probably as good, or nearly so, as that which succeeds the summer-fallow on clay. Supposing the following clover and wheat equal in both, according to soil, still there remains
a great

a great superiority in the article of manure ; for all that is raised by the consumption of the turnip crop is so much superiority to the clay soil. But reverse the medal : suppose cabbages to be introduced on the clay, and the scene is totally changed : that crop will far exceed the turnips, yield much more profit, and enable the farmer to make a great deal more manure : for these reasons, the recommendations cabbages have lately had, appear to be extremely well founded ; and consequently those farmers, who possess the proper soils, cannot determine too soon to enter on the cultivation.

But there is another circumstance attending some sorts of cabbages, which make them highly adviseable on all farms, which is their lasting for sheep feed quite through the spring : the Scotch cabbage, turnip cabbage, cabbage turnip, and green boorcole, come into perfection the beginning of April, and lasts extremely well to the middle of May, the most pinching six weeks in the whole year. Turnips will do no such thing; consequently those farmers, who possess turnip soils, should on no account slight the culture of cabbages for this purpose.

Water-furrowing.

Observe well all new-plowed lands, to cut water-furrows through them, as soon as the fields are finished. Saving a trifle of money in the omission of such a necessary work, often hazards a crop, and is sure greatly to damage it. In making them have a sure eye to the descents and variations of the surface, so that no water can lodge in any parts, however wet the weather. Look also to the old water-furrows in the wheat fields, and those in the fallows plowed at autumn. If they are filled at any places, by the crumbling in of the moulds after frosts, or by the passage of moles, or other accidents, let them be cleaned out : too much attention cannot be given to keep your lands quite free from stagnant water,

Manure

Manure Grass-Lands.

This is the proper season for laying on several sorts of manure, such as foot, coal-ashes, wood-ashes, lime, malt-dust, &c. and in general those that are spread in too small quantities require a whole winter's rains to wash them in. The use of these manures, and other light dressings in February, are very beneficial; but, throughout the management of purchased manures, you must form some experiments for a year or two, before you extend the practice; to see which, at a given price, will suit your land best. Without this precaution, you may probably expend large sums of money to very little purpose. Nor would I advise you to trust to the mere appearance of the effect soon after the manuring; for some of them, particularly foot and malt-dust, will shew themselves the first heavy showers, in a finer green than the rest of the field; but your proof of it does not arise from fine greens, but weight of hay; and I have myself experienced, that the latter is not always an attendant on the former. Mark out contiguous half acres, calculate the prices of your manures, and spread on each piece a separate one; all to the amount of 20 s. an acre, for instance. At hay-time, weigh the crops; you will then know which manure, at the given prices, suits your soil best. This knowledge will prove true experience, and a very different guide from proverbs or random ideas.

Manure Green Wheats.

This is likewise the season for spreading superficial dressings on the green wheats, such as foot, ashes, malt-dust, pigeons dung, poultry dung, rabbits dung, &c. &c. and many other sorts in the neighbourhood of great cities. This is very good husbandry; but the profit depends on the expences. I shall venture to recommend your trying them in small, (half an acre

acre, for instance, to each) before you extend the practice to whole fields, especially those which are not dungs. As to the latter, provided the prices be not extravagant, there can be no doubt of their answering on all soils. Whenever a farmer has the choice of manures, never let him hesitate about which to take: he may lay it down as a maxim, that dungs of all sorts are excellent: other manures may be the same, but they are not so universal respecting soils.

Farm Yard.

Throughout this month, attend well to the farm-yard, and all the buildings where cattle are kept: see that every place is kept constantly littered, so that every thing is clean; and, if the stock of litter laid in in autumn will not last, it is time now, that you agree with some neighbours for a weekly supply of refuse straw or stubble: at all events, do not let there ever be a want of litter, either in the stalls or the yard; for this is the only way of raising large quantities of dung at a cheap rate.

Tares.

This is a proper season for sowing tares, called, in some places, vetches, fetches, thatches. &c. The land I suppose stirred in autumn: the first season in this month, that is dry enough, plow the land again, and harrow in three bushels an acre of seed. I suppose them designed for making hay, or feeding green; but, if they are for a crop of feed, two bushels will be sufficient. Tares for hay make a most excellent fallow year: they are mown before they draw, or exhaust the land at all, and their extreme luxuriancy and thick shade so mellow and loosen the soil, and kill all weeds, that, if the crop is good, and the seed sown not later than February, you will have a very good chance for a crop of turnips after them, on one earth;

earth; but, without such luck, this husbandry is far beyond sowing two crops of corn running. If a farmer thinks of sowing barley after wheat, barley, or oats, or oats after either, let him throw a crop of tares for hay between two of corn, and he will be sure to reap the benefit of it. They will give him, on middling land, from a ton and an half to two tons and an half of hay *per* acre, which, with their cleaning and enriching nature, will be found far to exceed any second crop of corn on the same land.

Water Meadows.*

This work is much neglected in England, and yet it is really important. Wherever a meadow or pasture is so situated, that water can be brought on it from higher grounds, whether by means of a river, ditches, trenches, &c. &c. it should by all means be done, though some expence were requisite to effect it. It will prove much the cheapest way of manuring; and, as it will be in your power, for most of the winter months, and executed annually, it will prove not less effectual than any other manuring. In case the water lodges in swamps or flat places, trenches must be cut through them, about a spade deep, and a spade and a half wide, to carry it off; because it should only run over the grass, but not remain on it. Wherever your water is, whether in river, ditch, or trench, it should be conducted over the grass, at various places, so as to water as much of it as possible. Suppose there is a ditch along the highest side of the field, the easiest management is to bring the water into that ditch, and then, by various outlets, flow it over the meadow. If the quantity is small, from one outlet at a time, stopping the rest. I have many times
observed

* By meadows the English mean, natural grass or pasture grounds.

observed running ditches, that might be let on to grass-lands, without the farmer's ever thinking of any such matter ; but the benefit of the practice is undoubted,

Potatoes.

This root is one of the most profitable crops the farmer can cultivate ; nor does the advantage of it depend on markets for selling them : for they will pay a beneficial price, given to cattle of various sorts, particularly hogs. In Ireland they feed their cows on them to great profit. The land, designed for potatoes, I suppose to have been plowed in autumn : they are to be planted the beginning of next month ; and, as they affect a good tilth, it will be adviseable to plow the land this month, preparatory to the planting earth, provided the weather be dry enough : but in this, as well as for all other crops, be sure to avoid ever going on with your ploughs while the soil is at all wet.

As this tillage marks the land designed for this crop, it is proper to caution those farmers, who are unacquainted with the culture, against applying too much land to it. If you have a great plenty of dung at command, you may enter largely into this husbandry ; but determine to plant no more land than you can manure at the rate of 25 or 30 large loads *per* acre ; for one acre, well cultivated, will pay you better than five, or even ten, but indifferently managed.

ARTICLE XXII.

Of the Culture of Black Oats.

[From Museum Rusticum, Vol. III.]

A correspondent of the Editor's has recommended this essay to our notice, in hopes, he says, it may encourage a more general cultivation of this grain; which, as it is of a hardy nature, may be sown early, and thereby is well adapted to many situations in Scotland, where late sowing never fails to make late reaping; the danger of which is very often too severely felt: the grey oats which is a very mean unprofitable grain is very generally used in light moorland farms; where, by the rules here prescribed, and which, he says, he has himself followed to advantage, the soil would secure a good crop of black oats; which, when properly cultivated, are as prolifick as the white oats, will yield as much meal, and are equally grateful to the taste of horses.

HAVING been for many years a practical farmer in the eastern part of the county of Essex, you will not, I hope, think me impertinent in troubling you on the culture of black oats, which I have very often to great advantage sown.

Most of my neighbours prefer the white Poland oat, which may, I own, in some circumstances of soil and situation be best. I prefer the black oats because they are hardiest, for which reason they suit best with my convenience; for, as a considerable tract of the farm I occupy is light land, I am under a sort of necessity of sowing this soil early, or, if a dry summer followed, I should have no return at harvest.

Few people allow more than one plowing for a crop of oats; but such as follow this practice are very wrong-headed; for they may assure themselves, that no crop pays better for plowing than oats; and it is on this account that I generally give my land designed for oats three tilths; whence I am morally certain arises the largeness of my crops, for I have

seldom

seldom under five, oftener six, and very frequently seven quarters from an acre, throughout a field.

Your readers will not be surpris'd at my having such good crops, when I observe, that I almost every year sow some oats on a fallow that has been well dunged ; and this I aver to be good husbandry, as it abates the rankness of the soil, kills many of the weeds, and prepares the land in an excellent manner for a succeeding crop of sweet wheat ; but I must observe, that I always clear my land of the stiff oat-stubble before I attempt to plow for the wheat.

I have already said that I sow black oats early on my light land : by early, I mean as early as the first week in February, by which time I have generally an opportunity of getting the land in proper order, for a light soil is soon wet, soon dry.

Let me mention once more to your readers, that it is on a light soil, which is apt to burn a crop, that I sow my black oats so early as the beginning of February ; for should any of them attempt to sow them so early in a moist, cold, stiff soil, and a hard frost should follow, the young blade would, in all probability, be killed.

I must also remark, that when I sow oats thus early, it is generally under furrow ; yet I sometimes sow them broadcast, and plow them in.

The quantity of seed I, for the most part, use, is about three bushels, which I find to be enough ; nay, I have sometimes from only two bushels had a good crop ; but then I have been particularly careful and attentive to the goodness of the seed, without which precaution I should not, unless the season had been very favourable indeed, have succeeded.

I have found it a very good way to sow first half my quantity of seed under furrow, and afterwards, sowing the remainder broadcast, harrow it in ; and this is often my practice when I sow the latter end of February or the beginning of March.

When

When I sow oats after wheat, which however is not very frequently, I turn up the stubble as soon as I conveniently can after harvest, and leave it rough through the winter. The first fine weather after Christmas, I lay it down smooth with the harrows, and immediately give it a cross plowing.

As soon as February comes in, if it is not a hard frost, I make the land as fine as I possibly can by the harrows, raising a fine loose mould to the surface, which is to be the bed for the oats to lie in; for I sow my oats directly under furrow; after which I pass a moderate-sized roller over the field, and then give it a slight scratch with a pair of light harrows.

This husbandry generally produces me a crop I have no reason to complain of.

My chief reason for troubling you with this letter is, to endeavour to persuade my brother farmers, that they do not, in general, allow their oats a sufficient number of plowings, one being the stated quantity.

If they would plow twice for this crop, they would receive more than twenty shillings an acre for their trouble; but if they would consult their own interests, and allow three plowings, it would often make fifty pounds difference to them in a field of twenty acres: this they will, perhaps, think wonderful; but it is no less true.

The black oats require particularly to be sown early, especially if the farmer wishes to have them of a fine glossy ebon colour, and that the crop should corn well; for if they are sown late, and wet weather follows soon after sowing, they will be apt to run all to straw; and if dry weather, and the soil is gravelly, it is a chance but they are burnt up.

I have found by experience, that black oats will yield a very large crop after turnips; and this I believe is simply owing to their being sown in a fine tilth; for the mould cannot but be reduced to very small particles if a crop of turnips has been well husbanded, especially if it is in a light soil.

ART.

ARTICLE XXIII.

Of the best method of cleaning corn lands from weeds.

[In a Letter to the Editor.]

YOUR 26th question, Vol. I. page 29. *What is the best method of clearing our corn lands from weeds?* is indeed a very important one to Scots Farmers. There is no part of good husbandry in which we are so far behind our neighbours in England and Holland, as this. The most part of our light grounds, especially such as lye in the neighbourhood of towns and villages, and in general that part of every farm which is called in Scotland Croft-ground, has been suffered to collect the seeds of annual weeds for many ages; so that one, travelling through the country, in the summer months, when these weeds are in the flower, sees nothing in many cultivated fields, but a continued blaze of these beautiful but destructive flowers; the rising corns are invisible; and in harvest when he examines the sheafs, a considerable part of them consists of the same weeds which have by this time sown new seeds, and polluted the ground for many succeeding crops.

Every farmer that has common sense, knows and feels the mischief he suffers from this source. He knows that weeds rob his crop of a part of the nourishment it would otherwise draw from the earth, and which is yet worse prevent it from receiving the beneficial influence of a free circulation of air; this he knows from experience, though perhaps he may not express it in such terms; but he will tell you, that his crop is smothered and choaked by the weeds. Every farmer is sensible of the risk he often runs in harvest, in winding or drying his corns, from a mixture of certain weeds bound up with the corns, that if the crop was clean, it could be carried in,
in

in half the time; in short every farmer is sensible that the benefit of good tillage and expensive manure is always lessened, and sometimes utterly destroyed, by this nuisance, and himself robbed of a considerable part of the value of his crop. Yet under a sense of these things, how many go on from year to year, patiently bearing these disappointments, inconveniences and losses, without ever attempting to remedy them? Shall I say from mere indolence and laziness! No, not altogether, for many common farmers do not deserve any such reproach; but rather from a kind of hopeless dejection and despair. They consider this loss as a necessary evil which must be submitted to. The enemy has already gained such strength that they despair of ever being able to subdue and to banish him from their territories; at least by any means but such as they think beyond their power, that is beyond their purses.

These things have tempted me to jot down a few imperfect hints in answer to the above question. Not that I have turned my attention more to this than to other parts of farming; or have discovered any thing in this branch, which I think worthy to be communicated to the public, but chiefly, that I may stir up more experienced farmers to correspond with you upon this point, and send you something more satisfying founded upon their own practice. For as I have already said, this is one of the chief points of improvement, with respect to which the farmers in Scotland need both to be instructed and animated, and without which all others will move on but slowly: a few plain judicious directions here are likely to be generally acceptable and useful.

There are a great variety of weeds that infest our tillage grounds; some that propagate by the root and remain continually in the ground; others that propagate from the seed, and spring up a new, from year to year; and a few which propagate both ways, such as the dock; it equally infests grass and tillage grounds, and I know no better way to get rid of

it, than carefully to pull it up by the hand, whether in corn or pasture grounds, at a time when it can be pulled even a day or two after a plentiful rain. As to the first, the root weeds, it is very difficult to clear the ground, at least from some of them, such as the reed-grass, coltsfoot, and several others; but the annual weeds which sow their own seeds are in far greater quantities, and much more formidable to the farmer; at the destruction of these the following directions are chiefly pointed. The first of these annual weeds which appear amongst our oats are the wild mustard, and wild turnip, called by the farmers here Rounces; these chiefly infest light grounds, seldom do much harm on stiff clay grounds, and are reckoned least dangerous in harvest. These are succeeded by the wild marygold, which our farmers call Gule, a much more destructive and dangerous weed in every shape, appearing in all ground, light and clay, croft and outfield. These three sorts of annuals prevail in all parts of Scotland that I have seen. The seeds of them seem to ly in the ground without vegetating, till brought near the surface, for years, nay probably for ages. The longest resting of ground seems to have little effect to destroy them. In gravelly grounds, which have lain in pasture eight and ten years, I have seen the wild turnips and mustard appear in prodigious quantities, even in the ley crop if the season happened to be dry, still more in the second; in the third the marygold commonly appears, and they continue to encrease as long as the ground is in tillage. From any experience that I have had, I reckon a dry summer more favourable to these weeds than a moist one; or, to speak more properly, less favourable to the crop, I mean it runs a greater risk of being hurt and choaked by them. I could mention other annual weeds, common on moist grounds; the swine thistle thought to be encouraged by lime; the common thistle; but farmers are in use to weed out these by the hand, though they absurdly suffer the last to grow and come to seed on their pasture grounds, and their light seeds to be waisted by the wind over their own corn fields and their neighbours

neighbours to a very great distance. I am not perfectly sure, however, whether the thistle on pasture grounds may not be a different species from that which grows in corn fields.

Besides, a proper care, which every farmer ought to take to clean his seed corn, to prevent the seeds of weeds from being carried from his barn yard or any other places, to his dung-hill ; and to have his dung sufficiently rotted, and these pernicious seeds thus destroyed ; in order to clean his corn fields from annual weeds, the following methods may be considered and tried.

I. *A clean and thorough summer fallow.*

This is the most effectual of all methods, and yet the most unlikely to be tried by the common farmer. He is sensible of the distant profit, but is frightened by the present loss—the loss of his rent for a whole year ; and the expence of six or eight plowings. Yet I know a common farmer so wise and so determined upon this point, that, with no great stock, not L. 150 upon a farm of 90 acres, for which he pays L. 60 of yearly rent, and the remainder of a tack, which when it came into his hands was not above ten or twelve years; yet fallows at the rate of 15, 20, or 22 acres yearly, and will therefore, in a course of four or five years, clean his whole grounds. This however is a singular instance, which deserves, and I hope, will meet with all due encouragement at the end of the tack, besides the reward of wisdom and industry even before that time. Yet it cannot, and ought not to be expected, that the generality of farmers will venture on this practice, and pursue it so far as to go over the whole ground in their farms, till they get longer tacks than nineteen years, and learn to plough with two horses. Whatever may be done for the sake of a crop of wheat, in East Lothian, and round Edinburgh, Glasgow, and other great towns, fallowing is a practice scarce known in the west of Scotland.

II. *Horse*

II. *Horse-hoed crops of Potatoes, Turnips, Carrots, Cabbages, and Beans.*

This is a method almost as effectual as the former, when the rows of the potatoes, &c. are sufficiently wide, even six feet distant from each other. And it has this great advantage above the former, that it is attended with no immediate loss; but in some of these crops with a present and certain gain. Besides the grand, and the only point, for the sake of which I mention it at present, the cleaning of the ground for the benefit of succeeding crops; a common farmer may easily raise upon his croft grounds horse-hoed crops of potatoes, carrots, cabbages, which, after deducting all expences, will be more valuable to him than any crop he can expect; but his other objection is, that he is unaccustomed to it, and that such crops require more attention and trouble than he can bestow. Let him try, however, an acre or two. and go on with more if the trial succeeds; he will not, I imagine, repent the trial. A year or two will make him sufficiently master of the horse hoeing operations. He needs no new implements but a small plough, such as a single stout horse can easily draw; the Scots form is as proper as any other; it will cost him about a third less than his present plough, it will be useful to him in fallowing his barley, and for many other purposes. With respect to the attention and trouble, the farmers here bestow six times more in cultivating a rood of potatoes with the spade and the hand-hoe, than two acres of horse-hoed would require.

I do not describe the operations and the times of them just now, so minutely as to make them perfectly intelligible to a common farmer; it would swell this letter to an undue bulk, and is a new subject. It will be sufficient to say, that I look upon potatoes, as the most profitable of all the horse-hoed crops named, though I confess I have not yet tried the rest to an extent sufficient to ascertain this point. But potatoes is a root with which our farmers are well acquainted, both as to

the culture and the use of it to their families and to their cattle. They are accustomed to plant it with the plough, though not to hoe it. If an acre is intended for this, it ought to be plowed once or twice before, in winter and spring, and harrowed so as to fill up the old furrows, as much as may be, then laid out in new and deep furrows with a four-horse plough, straight, parallel and distant from each other, at least four feet, six feet, or as wide as you please. I only lay dung in these furrows or rows. I hoe at least five times in the months of June and July, and each hoeing costs about three hours work of a single man and horse; I dig them with the spade. The value of an acre of potatoes cultivated in this manner, the rows at four feet distance, if the ground and the season answer, is from L. 12 to L. 15 sterling, often more. The expence of the first plowing, dung, seed, planting, hoeing, and digging, charging every thing at the common price of labour, &c. in this country, is considerably within L. 4. These however cost the farmer no money, as he furnishes and does every thing with his own cattle and servants. When I speak of the value of the crop, I mean the value to the farmer at a distance from any great town. This is calculated at the price he gets for a few pecks from his neighbours; he cannot sell his whole crop at that price, there is no sale for it in such a situation; but I consider them as of that value to his family, and I assure you I do not exaggerate, but speak from full knowledge and experience. I have seen potatoes planted at ten and twelve feet distance in the rows. This will diminish the produce from the acre one half. In this case, the design was not only to give a fallow to the ground, and to clear it of weeds, but to level high ridges; and after this was in some measure accomplished, a row of turnips was sown exactly in the middle between every row of potatoes, and as late in the season as possible, to leave time for their growing to any bulk; after the potatoes had got their due, the operations of hoeing were still continued for the sake of the turnips. I look upon six feet however as sufficient for all the purposes of fallowing, and

in the succeeding crop of wheat, can see no difference betwixt this preparation of the ground and a clean summer fallow.

The soil proper for potatoes is a dry light loose free soil; the nearer it approaches to sand so much the better for that root. That part of his crop which is most inclined to clay and retains the moisture, will not answer for potatoes or carrots; in place of them, the farmer may substitute cabbages. But he cannot raise the plants. Why? they are as easily raised almost, as green-kail plants. Even these, I mean green-kail, would, I doubt not, be a very profitable horsehoed crop, tho' I have never seen them tried. They will grow on any soil, and are much improved by dung, which they seldom get in this country; or the farmer can drill with his hand, or dibble two rows of beans, which will answer his stiff soil in place of potatoes, and hoe them in the same manner. This, though the least profitable of all the horse-hoed crops, will yet indemnify him for the dung, trouble, and time spent on the fallow. But his neighbours will laugh at him for such whims. It is very likely they may, and he will laugh at them next year in his turn, when he shews them a clean crop of wheat or barley.

III. *Harrowing down the weeds.*

To clean corn fields, suffer the most part of the annual weeds, within the reach of vegetation, to spring fully, and then destroy them when the seed is sown, by a thorough harrowing; and about two or three weeks after, by a second slight harrowing. This is the simplest method imaginable, to clear the ground of this nuisance for a single year. It is a method which may be easily practised by every common farmer, without much danger of being exposed to the ridicule of his neighbours. It is strange, it never has occurred to many judicious and thinking men among themselves; and yet more strange that few of them will follow it, when they see the benefit of it before their eyes! It may be done at the sowing of Polish oats, which on early ground,

ground, needs not be sooner than the first or second week of May. But the most convenient grain for this operation, and indeed the only one with which it can be done to purpose, is barley or bear, because this is sown later than any other.

Let the farmer, instead of leading out his dung for his bear, in the beginning of May, when he commonly stirs and sows it, lead it out in the end of March, or at latest in the first week of April, and lay it down on the ground he intends for bear, fallowed or plowed we shall suppose only once before, during the winter, or very early in the spring. Let him spread the dung evenly on the surface of the ground, and plow it down in the usual way, as if he intended instantly to sow his bear or barley. But instead of this, after perhaps a single tine of light harrowing, let the ground lye in that state for four, five, or six weeks, as the season answers; that is, till the ordinary time of bear sowing. Against that time, most part of the annual weeds within reach of the influence of the sun and air, will have vegetated, or be sprung, encouraged as they will be, by the season of the year, if in any degree mild and moist, and pushed forward, by the heat of dung. The whole field will be covered by them, quite green, and the more so, the fouler it has been before. Let not the farmer be discouraged by this unpromising appearance, let him rather congratulate himself upon it:—Let him not be persuaded by his neighbours, to give the field a third plowing, (as I have often been advised to do) the effect of this, would only be, to bring up to the surface, a new crop of these accursed seeds, which have never seen the sun, and give them an equal chance with his own precious seed. Let the farmer chuse a dry time, which having no dung to lead, he has more in his power than his neighbours; and without fear sow his seed (giving a little more than usual) upon the top of the green carpet, be it never so thick; let him destroy its verdure effectually, by the break harrow, and continue at it till the ground be all black. About twelve days, a fortnight, three weeks, or even longer, as the

weather

weather answers, let him give another harrowing with the light harrows, without fear of hurting the tender crop; or if it is hurt, draw the roller over it to transplant whatever was torn out.

It was, if I remember right, in the year 1766, when the season was remarkably favourable for these different operations, by frequent warm showers, to bring forward the weeds, and sufficient heat and drought to kill them at the harrowing, that I had an acre of bear on the foulest ground imaginable, and yet by this management so perfectly clean, that you could scarce have found a single weed in it. I have always since that time found considerable benefit from the practice, but I confess never so much as then. You will easily see, that this method is chiefly calculated for destroying the wild mustard and turnip which spring early: the marygold, being a later plant, has a better chance some of it to escape; yet the grain being, in its most tender state, freed from the incumbrance of the early weeds, quickly grows so strong of itself, as to master and destroy the later weeds. I really believe, that the first crop of weeds, many of which have come to a considerable bulk when destroyed by the break harrow, and rotting near the surface of the ground, has the same good effect as a slight dunging or top dressing has: it raises a degree of fermentation, or gentle heat, which nourishes and cherishes the rising grain; while at the same time it is too strong for the smaller seeds of the weeds, just beginning to vegetate, and is sufficient to kill many of them. Thus, what seems most destructive to the crop, may be turned to its improvement. Indeed, such is the wisdom and goodness of the great author of nature, apparent in the general course of her various operations, that it is reasonable to believe, that the few things, which seem to have a pernicious tendency, might be turned to serve very salutary purposes, had we sufficient attention and sagacity to discover the proper methods of doing it.—But to return.

IV. *Oats sown on a winter tilth, and harrowed a-new after they are well sprung.*

This, like the former method, has a chance to kill two crops of the annual weeds, one by the winter frost and the first harrowing, and another by the second. Farmers may learn many useful lessons from gardeners, and the methods of culture they pursue. Observe that part of the garden which happens to be laboured and dressed before winter, for flower-roots, early cabbages, or any other purpose. It continues, during a great part of the summer, much cleaner of annual weeds, than the rest of the garden digged and dressed in the spring.—The above practice can only be followed, when the ground is pretty free of root weeds, and pestered chiefly with annuals. The crop of oats will receive little prejudice from the circumstance of its being sown on ground consolidated or battered by the winter rains. Oats will do with any sort of tillage, and almost without tillage at all; not so well, to be sure, as upon a fine tilth. If your grounds be clean, give a second tillage or not, as you please; but if they are foul, your oats will suffer much more from the weeds raised and encouraged by the second tilth, than from the want of it.

V. *Sowing Beans or Pease.*

Sowing beans, and in such grounds as will not answer with beans, sowing peas, with the hand, in drills, in every second furrow after the plow; and hoeing the spaces between the rows, with the hand as oft as they will bear; according to the sensible directions given in a letter, [Vol. I. p. 246.] from East Lothian, signed RUSTICUS. I take this opportunity, the first that has offered, of returning my thanks to RUSTICUS, for the information contained in his letter, and requesting (with your leave), his further correspondence.

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Any thing he chuses to send in the experimental way, will, I dare say, be useful and acceptable to the public. I had practised that method of sowing beans some years before I saw his letter, at the same distance, and nearly in the same manner with him; yet have been obliged to him for several judicious hints, and particularly as to the quantity of seed in which, from the trial made this year, I believe he is perfectly in the right. It gave me pleasure last summer, to see this sort of husbandry creeping in, all round Edinburgh both East and West, tho' it has not yet reached the more distant parts of the country. I observed however, that they hoed their beans, only with the English hand-hoe, which cuts and draws the earth towards the workman, and requires many repeated slight strokes. I have always used, in this business, the Dutch hoe, which pushes from the workman, and being open in the middle, lets the weeds and earth through. Farmers should have them made for this business, from ten to fourteen inches broad, or wide, thus they will command at one stroke, the whole space between the rows of the beans; and do the work in a third, perhaps in a half less time than the English hoe: As the beans are ploughed in, I am doubtful whether they receive much benefit from the earth drawn into their stalks; if this be thought necessary, the second hoeing may be done with the English hoe.

VI. *Lastly*, A luxuriant crop of any kind, especially red clover, or peas, assisted by a slight top dressing of lime and dung, will raise a fermentation on the surface of the ground, and effectually destroy the seeds of the annuals that would have sprung that year, as well as prepare the ground for a succeeding crop, that will produce the same effect in an inferior degree, the next year. Indeed the four last hints reach no further than a single year; but if such practices be frequently repeated, they will make the ground gradually cleaner and cleaner. A farmer can summer-fallow and horse-hoe
only

only a small part of his ground at once ; and the other methods may be attended to, and pursued as far as they are thought reasonable, in the rest of his tillage grounds, till they are likewise fallowed or hoed in their course, and the whole farm gone over according to the two first methods, which are the only effectual methods of cleaning it that I know. When once the light grounds of a farm are tollerably clean, no attention or pains should be spared to keep them in that state, or which amounts nearly to the same thing, to keep them in heart; by never over-cropping them after they have been limed and manured; by a judicious change and succession of crops; avoiding the repetition of white crops, particularly oats, which perhaps are more favourable to annual weeds than any other, and laying them down often with grass seeds for hay and pasture.

I heartily approve, gentlemen, of your design, and wish you may receive that assistance in the execution of it which you desire, and seem to expect, from experienced farmers, and which many of them are well qualified to give you. Independent of this, you have an inexhaustable fund at your command, for the entertainment and instruction of your readers; you can lay before them well chosen extracts on some of the most necessary and important branches of farming, from books, which most of us have little time and opportunity to peruse. If you continue, to go on in the tract in which you have happily set out, and confine your attention entirely to practical husbandry, I am convinced you will narrate many facts, and suggest many things, worthy of the attention of all farmers, which, if they are not useful to the generality of them, will yet be really useful to the attentive and candid part of your readers; for as one of our best practical writers justly observes, *None but the wise can be made much wiser, and to him only that bath shall be given.* I am,

S I R,
your most humble Servant,

Ayrshire,
Jan. 19th. 1774.

TITYRUS.

ARTICLE XXIV.

*Malt-dust or Cumming recommended as a Manure for Young
Grass.*

[In a letter to the Publisher.]

AGRICULTURE without doubt is the first of arts, since all others depend upon it. The farmer therefore is the first and most important member of society: of consequence, every attempt to assist him to manure and cultivate his ground to the greatest advantage, is an attempt to serve the public, and in fact is worthy of praise.

I pretend not, Mr Printer, to be one of those useful persons who have it much in their power to be serviceable to society in this way, though I acknowledge it would not be moving out of my own sphere. I might indeed teach any farmer the methods which I have discovered as most advantageous in the management of my own farm; because this knowledge is the result of several years practice: but I cannot pretend to discover, like the chymist, the peculiar property of matter, and whether it is likely to become a valuable food for plants, or any such nice things as this.—What I propose to mention to you is, the effects of malt cumming as a valuable manure for young grass. I never made the experiment upon any other. It is true, there are a variety of circumstances to be considered, in making experiments, in different soils and different climates; and allowance must be made for these, else the result of them will appear perhaps quite the reverse of each other: but if I may be allowed to judge, from the happy effect the cumming has had upon my field, which is perfectly evident, it is well worthy the recommending to others. Let them be applied any time in the busy season of making, in such proportion as may be judged most proper, they must not be sown too thin; I cannot pretend to fix the quantity most proper for an acre, as I did not apply mine on purpose to acquire

experience ; at least I was almost quite satisfied that it was as much a hum as Baron Van Hauk's most wonderful manure, though much less expensive. I therefore only recommend it to the trial of others, who have not been disgusted by the expensive commodity above named, and its industrious venders. How amazing the credulity of mankind ! how impudent the impostor who can practise upon the simplicity of farmers !

Haddington,

Jan. 5th, 1774.

ANONYMUS.

* * We will be much obliged to our correspondent, for an account of his further experience of this manure ; although it can never become a general manure, as it can be obtained only in small quantities, and in the neighbourhood of great towns and maltsteads ; yet to such as can obtain it, this notice of its utility will be of moment.

The following article from the *Museum Rusticum* Vol. III. shows that it is not a meer conceit ; but is already well known and practised in England. And as the experiments there narrated appear to have been made with great accuracy, and at the same time contain a comparative trial of other manures, we could not deny our readers the advantage and pleasure of it.

A R T I C L E XXV.

On the benefit of Malt-Dust, as a manure for a stiff soil ; with a relation of some experiments, made to ascertain its virtues.

[From *Museum Rusticum*, Vol. III.]

FOR the benefit of your farming readers I shall communicate a few experiments I made some time since, in order to try the virtue of malt-dust as a manure for a crop of wheat.

I had often heard it asserted, that malt-dust was much better suited, as a manure, to barley than wheat; for the latter lying a whole year in the ground, and the malt-dust being sown with it, the virtues of the manure were exhausted long before the summer, when the corn principally wants nourishment, being advanced in its growth, and served chiefly to make the wheat winter-proud.

Others, contradicting this assertion, said it was best for wheat, and made it appear that it often caused very good crops of corn, particularly after a hard winter.

Being determined in my own mind to try some experiments in order to determine this matter, I pitched upon a field of ten acres, which had born a good crop of horse-beans; after which it was sown with turnips, which being fed off, it was summer-fallowed, being intended for wheat.

The soil was a stiffish loam; it was in good heart, and tolerably clean.

I divided this field by deep furrows into ten equal parts, each containing one acre, numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10.

The whole field, during the course of the fallowing, had four plowings, which reduced it to a fine tilth.

When wheat seed-time came, I sowed number 1. broadcast, with three bushels of wheat, and plowed it in, laying on no manure whatever.

Number 2. I sowed with the same quantity of wheat, after which I strewed over it ten quarters, or eighty bushels, of malt-dust, and plowed that and the seed in together.

Number 3. I sowed also with wheat in the same manner, except that I deferred strewing on the malt dust till the latter end of January.

Number 4. had a dressing of dung in the ordinary way, and was sowed with three bushels of wheat like the other parts.

Number 5. was dressed by sheep folding, and was also in like-manner sown with wheat.

Number

Number 6. was sown with wheat in the same quantity, and in February, after sowing, received a half dressing of very rotten dung, which had been several times turned and mixed.

Number 7. after receiving a plowing in the spring, was sown with ten pecks of barley, which was harrowed in, and no manure at all applied.

Number 8. was sown with barley, as above, but had ten quarters of malt-dust laid on it.

Number 9. had in the winter a good dressing of dung, and was in the spring sown with the same quantity of barley.

Number 10. was sown with barley, like number 8. only it had five instead of ten quarters of malt-dust laid on it.

It may be necessary, perhaps, to observe, that all the pieces of wheat were sown the first week in October, and all the barley the second week in March.

Soon after Christmas I went to take a view of my wheat, when I found that the acre marked number 2. looked most forward and flourishing; though I must own there was in appearance but little difference between that and number 4.

The numbers 1, 3, and 6. neither of them looked so vigorous as those already noticed; and number 5. seemed rather thin on the land; but the wheat plants were in good condition and healthy.

In May I took another view of my wheat crops, and found number 1. tolerably clean, and promised well.

Number 2. gave me hopes of a large crop, and was surprisingly clear of weeds.

Number 3. was greatly improved since the laying on of the dressing of the malt-dust.

Number 4. looked very vigorous and strong, but was very foul, having several sorts of weeds not to be met with in other parts of the land.

Number 5. was thin of plants, and they did not branch much; however, they still seemed healthy and strong.

Number

Number 6. was like number 3. greatly improved ; but it was foul, and, what appeared strange to me, had many weeds of a nature quite different from those with which number 4. was infested, though the dung laid on both these parts was taken from the same heap.

I, at this time, also looked at my pieces sown with barley, when I found number 7. promising and clean.

Number 8. was forwarder, and flattered me with the prospect of a large crop.

Number 9. was forward and fine, but foul with weeds.

Number 10. bore much the same appearance as number 8. and promised as well.

At harvest number 2. of the wheat was first fit to reap, after which succeeded number 4. the rest were ready nearly at the same time.

Of my barleys, numbers 8. and 10. were first ready to mow.

I suppose it is unnecessary to observe that those crops which were clearest of weeds were the soonest fit for carrying.

I ordered these crops to be all laid separately ; and as I was obliged, just after Michaelmas, to go up to London, about some particular business, I left orders with my grieve, that they should all be separately threshed and dressed as early as might be in the winter.

The produce of the several crops was thus distinctly noted to me, for I had ordered that particular care should be taken not to mix one with the other, and on enquiry, I found my orders were punctually carried into execution.

	Bushels.	Pecks.
Number 1. unmanured, yielded of wheat——	20	1
Number 2. manured with malt-dust when sown — — —	28	3
Number 3. manured with malt-dust after Christmas, by way of top-dressing —	41	0
	Number	

Number 4. manured with dung in the ordinary way	—	—	—	32	2
Number 5. folded with sheep	—	—	—	29	3
Number 6. dressed with rotten dung in February	—	—	—	30	0
Number 7. unmanured, yielded of barley—				32	3
Number 8. manured with ten quarters of malt-dust when sown	—	—	—	48	0
Number 9. manured with dung in the winter				40	2
Number 10. manured, when sown, with five quarters of malt-dust	—	—	—	44	0

I must, with your leave, trespass upon your readers patience, till I make a few observations on the above state of the produce of my crop.

First, I conclude, that when malt-dust is used as a manure for wheat, it is best to lay it on by way of top-dressing after the corn is come up, as the crop of number 3. yielded above twelve bushels more than that of number 2. and I am apt to think that the virtue of the malt-dust laid on number 2. was exhausted before it could be of any essential service to the crop; whereas, in number 3. the manure began to yield forth its virtues just as the wheat plants began to be in want of a fresh supply of nourishment. It was also observable, that the grains of wheat which grew on number 2. were thinner, and had less substance, than those of number 3. the grain of which was fine, plump, and heavy.

The produce of number 4. convinces me that malt-dust is, in many cases, a better manure for wheat than dung, not only as it gives a larger increase, but also because it does not stock the land with destructive and devouring weeds.

The wheat grown on number 5. was as fine as that of number 3. but considerably less in quantity, as appears by the account.

I do not much approve of the method pursued in number 6. yet it is a good alternative, if the farmer happens to have too little dung to dress all his fallows.

I judge also malt-dust to be a very good and profitable manure for a barley crop; but the yield of number 10. being forty-four bushels, and of number 8. only forty-eight bushels, which last is not an encrease in proportion to the additional quantity of manure laid on, I thence judge that eight quarters, or sixty-four bushels, of malt-dust, is the proper quantity of malt-dust to lay on an acre for a barley crop, and that at the time of sowing.

When I speak of malt-dust, I mean the kiln-dust, which falls from the malt in drying: as to the tail-dust, which falls through the screen whilst the malt is cleaning before it is put up in sacks, that may be applied to a better use, being generally given to pigs, and often to cows, in which last case it makes them give a great deal of milk.

It has been suggested, that the virtue of malt-dust, as a manure, lasts only for one crop; but this is a mistake, for when this manure is laid on in January or February, a good crop of barley may be had after the wheat.

Malt-dust is of a very warm nature: this has induced many farmers to think that it will burn a crop; and I will not answer for it but it might do so on a hot gravelly soil; but on clay land, or a stiff loam, it seldom or never does any damage: and indeed the only danger is a dry time ensuing after it is spread on the land, for the first shower of rain washes it in, and secures the crop from all hazard of being burnt.

Many of my acquaintance, besides myself, have found that malt-dust is for a stiff soil a better manure than dung; but the dispute among them was, whether it was most profitable to lay it on when the wheat was sown, or by way of top-dressing in January or February; however, since I made the above experiments, they are all converts to my opinion, and
are

are determined in future always to dress their heavy wheat land with it after Christmas.

One thing more in recommendation of this my favourite manure, let me add, before I conclude, that nothing surpasses it when laid on cold grass grounds, to the amount of about eight quarters, or sixty bushels, on an acre, but not less.

Such as have not seen its effects in this way applied, would be surpris'd at the large encrease of sweet feed which it occasions: in short, whoever finds it necessary to dress such land, and can get malt-dust in a sufficient quantity, will do well to use it, as they will be puzzled to find any thing in the extensive circle of manures better adapted to the purpose.

I should be glad, if some of your correspondents would give the public their opinions relative to the various disorders to which cattle are subject: this is a large field, and has, I think, had but little said of it in your collection.

In relating experiments in husbandry, a great deal will still be left to be regulated by the farmer's prudence, experience, and discretion, as circumstances of soil, seasons, &c. must vary; but in this matter of the diseases of cattle, if the symptoms of each disorder are but carefully pointed out, and the proper remedies laid down in plain language for the different stages of the disorder, there will be very little danger of the honest farmer's making any mistakes to his prejudice.

The fellows who go about the country, pretending to cure the diseases of cattle, are, in general, great cheats, getting much money, but doing little good. I never could persuade any of these gentlemen to let me examine the drenches they gave my cattle, being, probably, fearful I should thereby be enabled to discover and detect their gross ignorance.

T H E
SCOTS FARMER,

FEBRUARY 1774.

ARTICLE XXVI.

Of the Culture of Pease—Of the Culture of Beans.

[Dickson's Agriculture Vol. II.]

THE pea is a grain very different from any of those already mentioned. A crop of it is not so valuable as a crop of the others, though it is much used in some places by the common people for bread.

In sowing pease great regard is paid to the value of the straw; and the advantage, that the land, upon which it is sown, is supposed to receive from the crop. Pease-straw is reckoned better feeding for horses than any other kind of straw, and, if a crop of pease does not enrich land, at least it does not take so much nourishment from it as a crop of any of the other grains mentioned. When the crop is good, the straw covers the ground, and thereby preventing a free communication of air, destroys all the small weeds. The preventing a free communication of air, occasions likewise a fermentation with the rain and dew upon the surface, by which the particles of the soil are minutely divided, and the vegetable pasture greatly enlarged. Besides, pease push down their roots much farther than any of the white grains, and draw part of their nourishment from below the reach of the plough. The corruption of the weeds, destroyed by the pease, and the enlargement of the vegetable pasture, by the fermentation of the corrupted air and water, are supposed to do more than over-balance

lance all the loss of the vegetable food carried off by the crop.

There are two kinds of pease cultivated in our fields, called the white and gray. The white is the most common, and generally, as appears from the seed, is a mixture of several sorts. All of them seem to be species of the pea cultivated in our gardens; there is scarcely any difference, but in the colour of the flower and seed. The gray is different, and seems to be a species of the vetch or tare: This one is the hardiest plant of the two, and thrives on soils, and in climates, where the other kind does not succeed.

The two kinds are frequently mixed together, and in some places, the white wears out, and in a few years, nothing but the gray remains. On other soils, the gray wears out, and nothing remains but the white. A little attention to this, will point out to the farmer, which of the two he should sow. The straw of the gray pease is rather better than the straw of the white, the pease themselves are as good for horses; and therefore, the farmer should give some attention to this kind, where the other does not thrive, though the value of the grain be not so great.

The white pea is divided into two particular kinds, called hot seed and cold seed. These names are given for the same reason that they are given to the oats. The sowing of the hot seed may be delayed three weeks after the cold seed is sown, and yet the pease be as soon ready. It is observed, that of the cold seed there is sometimes a great crop of straw and very few pease; and of the hot seed, that when there is a good crop of straw, there is always plenty of corn likewise. This, if true, points out, that the hot seed are the most proper to be sown, when the land is in very good order, and no danger of the crop failing.

The time of sowing is from the first of February to the end of April. According to the principal design in sowing, the pease should be sown earlier or later. The earlier sown pease have

have the best chance to produce a crop of corn, and the late sown to produce a crop of straw. The growth of plants is, generally speaking, checked in the month of July by drought and heat, and is promoted again by the rains in the month of August. It may be observed, that grass, that in the month of July is parched and withered, in the month of August attains a new verdure. If the pease are so far advanced, as to be beginning to fill in the warm season, their growth is stopped, and the grain fills; but if they are only in the blossom at that time, though their growth may be a little checked, yet it comes on again in the month of August, and they continue growing without filling till stopped by the frost. As one year in four or five the pease crop fails, and the pease rise to a very great price, it is not proper to risk the whole crop, by delaying to sow all the seed till late in the season. When the land is clean and in good heart, the pease may be sown early, because on such land, a good crop both of corn and straw may be expected. But if the land is foul or wet, the sowing of the pease should be delayed as long as possible, because on such land the crop is more precarious, and the failing of a crop of pease gives such encouragement to weeds, as to endanger the following crops likewise. When this happens, as sometimes it will, notwithstanding all the pains that can be taken, it is necessary to plow in the crop, to prevent the bad consequences that may follow. For when a bad crop of pease is allowed to stand, it does more harm than all the value of the crop.

The quantity of pease sown upon the acre, is from four to five and a half firlots. In sowing pease, regard is to be had, not only to the situation of the land, but also to the principal design of the crop. If the principal design of sowing pease is to have straw and to enrich the land, then they should be thick sown; for when thick sown, they have a better chance to destroy weeds, and to cover the surface, than when thin sown. But if the principal design is to have a crop of corn, they should

should be thinner sown; for when thin sown, they have more air and fill better. It is to be observed however, that there is greater danger arising from thin sowing of pease, than from thick sowing. Pease do not stool as other grains do, they only branch out from the stalk. When the land is good, the other kinds of grain, by stooling, soon cover the surface, but it is long before the pease do this when they are thin sown; thereby great encouragement is given to the growth of weeds, and the drought allowed to penetrate the soil.

Pease are commonly sown after oats or barley, and sometimes after wheat. Seldom more than one plowing is given, and they are commonly sown immediately after plowing. The reason of this is, that they may be the better covered, for the sooner that any grain is sown after plowing, it is covered the deeper. If rain comes soon after pease are sown, it makes them swell much; and if they are not well covered, they come above ground, and are destroyed by vermin, or split in two, and thus the young plant is deprived of part of its support. When any grain swells in the ground, it swells mostly upward, for on that side it meets with least resistance; and besides, every kind of soil by heavy rains is at first battered, and rendered more compact, by which means, the soil that covers the seed is washed down from it.

Though pease are commonly sown immediately after plowing; yet some farmers sow them upon the winter furrow. They plow the land early in winter, and sow the pease early in the spring. This is a good custom when the land is stiff and clean. Stiff land when plowed has a very rough surface, which, though lessened a little by the winter frost, yet affords a sufficient covering for the pease when sown; and the land when plowed, being better exposed to the air and frost than when unplowed, affords more nourishment and a better pasture for the crop than when plowed immediately before sowing, and then harrowed. Besides, it is late in the season before this kind of soil is sufficiently dry for being plowed, and therefore

it may well be supposed, that it is in better order for receiving a winter than an early spring plowing.

Sometimes the pease are sown and plowed in. This does very well on light land, particularly after a crop of barley, the culture of which makes the soil open. But stiff land is apt to turn so hard upon the surface as to prevent them from getting up, especially if drought comes on after a wet season.

When pease are sown under furrow, the furrows of the ridges must be sown after the land is plowed, and before it is harrowed, for there is no seed left in them. If the ridges are cloven, or the furrows turned into crowns, care must be taken in sowing, to prevent, as much as possible, the seed from falling into the furrows towards which the ridges are to be plowed, for it is scarcely possible to prevent the seed from being too thick in these places.

The land designed for pease is, generally speaking, cloven. This is a good custom when the ridges are steep, as all of them were sometime ago. As wheat or barley are generally sown after pease, the land must be plowed before winter. Gathering is the most proper way of plowing before winter, and this follows best after cleaving. But if the ridges are not high, casting is the best method of plowing for them, or if the ridges are flat and narrow, they may be plowed in the ordinary way, the former plowing reversed, and the furrows turned into crowns.

Pease are generally the lowest priced grain, and yet sometimes they rise to a great price, when the prices of the others are moderate. This makes a scheme for saving seed of importance. The sowing in drills answers this purpose. For in drills one firlot sows an acre as completely as four in the broad cast way. But as pease sown in drills, take a long time to cover the surface, great encouragement is thereby given to weeds. To destroy these hoeing becomes necessary. This indeed is expensive; but if hands can be got, the saving of seed does more than ballance the expence, a better crop may
be

be expected, and the weeds more effectually destroyed. The operation of drilling may be performed with very little trouble and expence. A drill barrow pushed by a boy, follows the plough, and as one row is sufficient for two furrows, one barrow sows to two plows. But the advantages of drilling shall be considered afterwards.

Of the Culture of Beans.

The bean has a resemblance to the pea, only it grows with a stronger stalk, and stands upright. Pease and beans are often sown mixed together. This method is found to succeed very well, they ripen at the same time, require the same culture, and serve the same purposes. Besides, the beans having strong stalks and standing upright, in some measure support the pease, and give them air; by this means the pease become more fruitful.

What has been said with regard to the culture of pease may be applied to beans. However, it is necessary to observe that the bean pushes its root further down than the pea does, and therefore requires a deeper soil. It succeeds much better than the pea in a cold wet soil. The lands in Scotland, where beans are most commonly sown, and where they succeed best, are deep and wet clays. This may serve as a direction to the farmer when he shall sow pease and when beans.

On some lands the crops of beans are very great, and almost as valuable as of any grain. This should encourage the farmer to sow them on his richest lands, and take some care in their culture. There is no crop, it is said, that succeeds better in the drill husbandry than a crop of beans. The seed may be sown in every other furrow; in every two contiguous furrows, while the next two or three are past; and in a variety of other ways. But in whatever manner it is sown, if the land is proper for beans, and the weeds carefully hoe'd out, it seldom fails to produce a good crop.

ARTICLE XXVII.

THE FARMER'S KALENDAR

MARCH.

BARLEY.

THIS is the proper month for getting all the feed barley into the ground.* Crops, later sown, may be very beneficial;

* In Scotland the earliest time practised for sowing barley, is not before the end of April or beginning of May : Nay for the greatest part in the end of May, and with some slovenly farmers the beginning of June. This may seem to make the caution we gave in the beginning of our excerpts from this work p. 15. very necessary: But when the whole of this paragraph is considered, the provisions and exceptions he makes, rather establishes than weakens the authority of this author. That a great part of the barley in England is sown in March, is very certain; and it is as certain, that in Scotland we are generally too late in all our seed time. A disquisition into the causes of this difference might prove very useful. A late sowing never fails to make a late harvest; and the dangers of a late harvest are often too fatally felt, not to require some attention to investigate a remedy. If the climate is in fault, then indeed our case is desperate: But if we see farmers, who, by a proper application of draining, plowings, manuring, water-furrowing, &c. &c. have forwarded the barley seed time a month, yea two months more than was formerly in use upon these grounds; need we despair, by carrying that attention still further, if not to become quite so early as in England, to approach at least a great deal nearer to their season of sowing than we are at present. We are ashamed almost to mention, to the disgrace of Scots agriculture, that in some places, to this hour, the farmers do not strike their ploughs

beneficial; but, if all circumstances were equal, the March-fown would be superior to any later seasons, which is the only comparative point of consequence. This grain is sown after various preparations: turnips are the most common; which root will not last for feeding any cattle, with propriety, upon the average of seasons, longer than this month: so that the turnip-land barley must be sown on one earth, or the season absolutely lost; for April and May sowings are always inferior. I am not here asserting, that April is a month quite improper for sowing barley: I know the contrary from experience; but I will venture to assert, that if soil, plowings, manuring, water-furrowing, &c. &c. are equal, a March sowing will exceed an April one, on an average of several years, by six bushels in the crop. Saying, therefore, that barleys in certain places, sown in April and May, yield great crops, is saying nothing, unless you add, at the same time, the parallel success of other crops sown in March. Neither do I venture to insinuate, that all March-fown crops are to be successful: one indispensable necessary in sowing most crops, but barley in particular, is the land being quite dry. March may pass quite away, without a single plowing season, in the whole month, for wet lands. In such a case, I certainly cannot mistake so greatly, as to advise the sowing barley; but still this is not in reference to a particular practice, but to a general maxim in

ploughs till a certain day, nor will they upon any account begin to sow till another fixed day, let the situation of the ground and the weather be never so inviting. The design of this publication was to combat such unreasonable prejudices; and in their room to introduce better practices, founded upon reason and supported by experience. This end we shall endeavour to keep in view, and we beg leave again to repeat our former request to the farmers of this country, gentlemen and yeomen, to support us in our views, which we hope will be approved of as laudable and patriotic.

in husbandry. You ought never to suffer your ploughs to work, if the land is wet; consequently, advice to sow barley in March must always be under the proviso, that the land is dry enough to plow.

Turnip land, not cleared till this month, can only receive one plowing, and have the seed harrowed in: if more earths are given, the sowing time will be driven much too late. In this case, on many soils, the land will not be turned up in fine order: Six bushels should then be sown on each acre of land, unless the fertility is great, when five will do. Summer-land barley, on clay, or other heavy soils, should always be sown on one earth, in the first dry plowing season, whether in February or March. In some clay countries, the farmers have an exceeding good barley culture: they summer fallow their land, and lay it up on three-feet ridges, well water-furrowed for the winter. In a hard frost, they carry on their dung, and leave it in heaps till sowing time, when they spread before the ploughs: this is incomparable good husbandry, and can never fail of good crops. It is conducted, upon the same principle, upon beans, pease, tare, potatoe, or carrot land: all which crops are taken up in autumn, and the land plowed after them, on to the ridge, and well water-furrowed, ready for the spring-sowing. The great point is, to have the soil, previous to the crop, in such good order, that no other spring tillage may be necessary than the feed-earth. In such husbandry, there can be no fear of having good crops, nor is it practised any where, where bad ones are reaped. Upon lands thus managed, four bushels of seed per acre, if the soil is rich, are sufficient; and to harrow in the whole, the best way of covering it.

Much the most profitable way of cultivating barley, is to throw it into a regular course, preparatory to the clover. For instance: 1. Turnips. 2. Barley. 3. Clover. 4. Wheat. Or, 1. Cabbages. 2. Barley. 3. Clover. 4. Wheat. Another: 1. Fallow. 2. Barley. 3. Clover. 4. Wheat. Whatever variations may arise in the crops, still barley must always follow

either an ameliorating crop, or a fallow, and in all cases be followed by clover. In many parts of the kingdom, unacquainted with clover, this latter reasoning may appear bad; but that can only arise from false ideas of the use of clover. Let good grass lands be ever so plentiful, they will in no case be found to preclude the use of clover. Farmers, even on grass farms, that know not what to do with large crops of clover, I will venture to pronounce unworthy the name of farmers. No man, that has money in his pocket, can be at a loss to know how to dispose of any sort of food for cattle. What would any man wish to follow a barley crop? No sort of corn can succeed, according to the plainest principles of common good *husbandry*. To substitute pulse instead of clover, is certainly bad management; for the grass will prove as beneficial as either beans, peas, or tares, and it will more profitably prepare for wheat. That grain, sown upon a clover lay, must always be on one earth, which is a most favourable circumstance; and the propriety of keeping the land under the clover two, three, or four years, during all which time, the crops will be extremely fine, is another very strong argument. The mere amount of the clover crops is not the only enquiry; the *clear* profit of them is the great object; and grass, in that respect, is of peculiar advantage to the farmer, whatever his soil is; for clover, as long as it lasts, will pay a much greater profit, clear of expences, than any crop of corn the farmer can substitute, which, with the advantage of breaking it up for corn, either wheat or oats, renders the clover husbandry an absolute appendage to that of barley.

In respect to the management at sowing, there are two methods that are very different: the one is to harrow in the seed with, or upon, the barley-feed; the other, to sow it before the roller, after the barley is up. The reason of the latter practice has been owing, I apprehend, to the barley-crops in wet seasons, suffering a good deal from the luxuriant growth of the clover. I have had several fields of barley half spoiled

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by clover, sown with the corn. This reason is a very good one in many situations; but I think, with proper management, the evil might be easily remedied. I should propose the crop to be mown for hay, as soon as the barley began to ear: the great quantity of clover among it, which there must be to endanger the crop, would, with the barley, make an admirable one of hay, and, I apprehend, fully equal in value to the amount of a good barley one: Farmers are too apt to view corn, sacked up in market, as the only object of husbandry, because it is most saleable: they would act much wiser, if they esteemed the food of cattle as equally advantageous. Corn they prefer to beef, merely because it does not require so much stock in hand; but the difference between these productions, in other respects, is very great: for what comparison can be drawn between crops that exhaust the soil, and fill it with weeds, and others (the food of cattle), that ameliorate and clean it?

Oats.

While oats should now be sown in preference to any other season; and, in the general conduct of them, the farmer should, by all means, avoid the common error of sowing them after other corn-crops, by which they exhaust and ruin their land. They should always receive the same preparation as barley; nor ought a good husbandman to think of their not paying him as well for such attention as that crop. It is a very mistaken idea, to suppose it more profitable to sow barley on land in good order than oats. I am confident, from divers experiments, that oats will always equal, and, in many cases, exceed barley. The superior quantity of the produce will ever be found to more than answer the inferiority of the price.

What good reasons are to be offered for sowing oats on land in such bad order, that barley is not to be ventured in, I know not: I have never heard any satisfactory ones. The common argument is their hardness, which will give you a middling crop,

crop, about sufficient to pay expences, and leave a trifling profit, when no other crop will do the like ; but this is only proving them to be assistants of bad husbandry ; nor is such a paltry profit, granting false premises, (for I am well persuaded, that common oat crops, among bad farmers, are but so much loss,) an object that ever ought to influence good husbandmen. Why should a good farmer be at all solicitous to gain 10 s. an acre profit by oats after barley, &c. ? Suppose his course to be : 1. Turnips. 2. Barley. 3. Oats. Or, 1. Fallow. 2. Wheat. 3. Oats. In either of these courses, or in any other, where the oats follow another crop of corn, the profit of them must be very trifling. What comparison with sowing clover with the barley, which will pay far more profit, and at the same time prepare, in the best manner, for that most beneficial crop, wheat ? What but a fallow, or a fallow crop, can succeed the oats ? How unprofitable, compared to the clover system !

For these reasons, I cannot but strongly recommend to all farmers, that they should consider oats and barley quite in the same light, and never sow the one, unless they know their land to be in proper order for the other : To sow them after a fallow crop, and clover with them, in the same manner as with barley. Upon rich lands four or five bushels per acre are the proper quantity of seed oats ; but, on weaker soils, six or seven should be sown.

Pease.

This month is the proper season for sowing all sorts of pease, that were not sown in February ; nor is it proper to delay any of them later, if the weather now suits. White pease should be sown last, and on light land ; for they do not succeed well on heavy or wet clays. There are scarcely any soils, that do not suit some pea or other : Stiff clays do very well for the hardier hog-pease, and all lighter loams, gravels, chalks, and sands answer well in the tenderer kinds : they are both

both plowed and harrowed in; which variation sometimes makes a considerable difference in the crop; for if the land is apt to bind with rain, and the pease are plowed in, they sometimes do not rise at all, not having strength to pierce the plasted surface: but this evil only attends the very binding soils: on the contrary, when the seed is only harrowed in, if the field is not very well watched, the pigeons and birds will carry away much of it, and some allowance in the seed should be made for it. If land breaks well with the harrow, it is best to harrow in on all, but the very lightest lands; but on loose sands, or very light and porous soils, or those that are extremely dry, it must certainly be preferable to plow it in, on account of having a greater depth, and being farther from the sun, which is apt in hot summers, to burn these soils up.

Sow pease after corn; they always come in best after wheat, barley or oats, generally with good husbandry after wheat, because, in a farm truly ordered, barley and oats should ever have clover sown with them. I can hardly suppose a situation, where this is not the right management: they come very properly into such courses as these: 1. Turnips. 2. Barley. 3. Clover. 4. Wheat. 5. Pease. Or, 1. Cabbages. 2. Oats. 3. Clover. 4. Wheat. 5. Pease. Whenever wheat succeeds clover you may throw in a crop of pease after it, if it suits you better than to come again to turnips, cabbages, or beans, the first of the course.

Drilled Pease.

This pulse is, in some places, drilled, which is a very good method, and by no means to be condemned so generally, as most farmers do all crops that are sown by a drill plough. The great use of drilling pease, is the rendering it so much easier to hand-hoe them. Good farmers, whatever their soil, are always desirous of getting the hand-hoe into as many crops as possible, and few pay better for it than pease; but when promiscuously sown, the work is difficult and expensive to perform well; whereas, if they are drilled in equally distant rows

one

one foot, or nine inches asunder, the hoeing is as regular work as can be conceived: it will be executed much easier, better, and cheaper, and the crop be consequently superior. Another advantage in this method is the saving of seed; for a bushel, or a bushel and a half less seed, will do thus than in broad cast sowing. Here, therefore, is a case, in which drilling is really profitable, and will exceed the common husbandry. The point of admitting the hand-hoes better is a very important one; for that operation, given while the crop is quite young, checks the weeds so much at the same time that the crop is forwarded, that the tendrils join the sooner, and much the stronger for it; and, consequently, the good effect of a thick luxuriant crop, gained in a much compleater degree. But let the farmer, when he agrees to use the drill plough for this work, not be persuaded to change his purpose of hand-hoeing, in order to introduce a horse-hoe in wider intervals; that is, to sow two or three rows equally distant, and then, passing a space of two or three feet, drill a fresh system of rows, the intervals for ploughing. This is more complex husbandry, and will not answer so well; for the pease are very apt to fall into the intervals and be damaged by the horse and plough; an evil that has very bad consequences. The profitable drilling, therefore, requires a plough that will sow several rows equally distant at once; the greater the number, the quicker the work is done.

Tares.

If the weather in February did not allow your sowing tares, or at least, all your crop, the work must not be delayed longer than March, or the crop will suffer. The best way, is to plough the land flat, or on broad lands, and barrow in the seeds: but observe well, that the soil is dry before you go on with your ploughs; which is an universal rule, that ought never to be deviated from.

Carrots.

Carrots.

This is the season for sowing carrots: February, if the weather is unusually dry, is preferable; but, upon an average of seasons, the work will not be expedient till March. Plough the land in the common manner, but flat, and sow broad-cast about four pounds of seed to an acre, and harrow it in at thrice. If the weather is unusually wet, you may be prevented from getting on to the land; but, if possible, delay it no longer. The proper soil should not be mistaken through common notions, nor confined to a compass much within the reality. It is a general idea, that nothing but sands will do for carrots; but this is a most mistaken notion: the best soil in the world for them is a sandy loam, rather light, but moist, of a great depth; in which you will find very little difficulty in ploughing to the very beam of your plough; and all the soil you bring up of the same kind, and as fit for vegetation as the surface. This sandy loam, with these properties, should, in general, yield good crops of all sorts: the black-sands the best. But, at the same time, that I mention this sort, as of all other soils the most desirable, still I desire to add, that the crop will thrive to most noble profit on heavy loams but not clays; good wheat-loams, for instance, of the gravelly kinds, that plough pretty easy. At first sight, such soils might, perhaps, be thought too stiff; but the truth is, no kind of land will yield larger carrots; perhaps the gross-crops will be as large as on the best sands: but then the expences will run higher in cleaning, &c. I have known carrots tried on clays, and been made, by dint of tillage and manure, to answer on them; but the husbandry is not advisable.

If you would command your crops of this root, you should, before the seed-earth, manure the land with twenty-five, or thirty loads of dung per acre, pretty rotten: plough it in, and then cover the seed by harrowing. Such a conduct will insure very considerable crops, and pay better for the dung than

than perhaps any other application whatever. I have heard of dung spoiling or injuring carrots, making them grow deformed, giving them the canker, and making them ill-tasted; but I must remark, that I never remember any such effect in the many crops I have seen in different places. A farmer's object is, to produce as great a quantity as possible from every acre, and that must undoubtedly be by the help of manure.

I cannot leave this article, without recommending to all the professors of the lighter sort of lands that have a pretty good depth, to cultivate this excellent root with spirit, not to confine it to a little close of an acre or two, but to introduce it, in the course of the crops, on a farm regularly, like wheat, barley, turnips, or any other plant. I am confident, none will pay them better; and if they manage it tolerably, not one on the whole farm half so well: they will find the profit, on an average of soils and seasons, not less than ten pounds an acre clear, which will much exceed the advantage of three average-crops of wheat, with the great benefit of its proving a remarkable cleanser, and as ameliorating a crop as any in the world.

Potatoes.

March is the best season in the year for planting potatoes. The land, I suppose, to have received its first tillage in autumn; and, if it was inclinable to be rough, to have had a second ploughing in February. The first dry season in this month, it should be stirred again flat, turning in the manure of whatever kind: the best is rotten farm-yard dung; and the more that is laid on the better, unless the soil be very rich. Upon an average of lands, less should not be laid, than twenty five or thirty large loads per acre, which should be spread equally, that it may plough in well. As soon as the surface is harrowed smooth, the planting should be begun, which is best performed in this manner: a man holds a triangular dibble in his hands, which has three points, and a

place

place for him to set his foot on it, to strike it into the earth ; it so makes three holes at a time to receive the sets. A boy follows him with them, and drops one into each hole. After this, the land is harrowed twice or thrice, and the business is done. They are in this method, set promiscuously, at from nine inches to one foot asunder : the work is done quickly, and is not expensive. Another way, is to lay them in furrows after the plough, which is less expensive, but never so well done : they are not planted deep enough, nor are the sets well covered without a very minute attention to the ploughs. In the promiscuous way, from fifteen to twenty bushels of potatoes are wanting to set an acre.

Potatoes on Grass.

Grass land is often broken up for a crop of potatoes, and by most people preferred to any other : the methods are, first, to dung it moderately, fifteen or twenty loads per acre ; then to dig up the turf, and work in the dung at the same time, and dibble in the sets, in the way before mentioned. You scarcely ever fail of great crops in this method. Another is called the lazy-bed way : you dung the grass as before, and mark it into beds five feet wide, with narrow slips between them two feet wide : you then dung the beds about fifteen loads per acre ; on the dung you lay the potatoe slices, after which the turf is dug thinly up in the two feet intervals, and laid on the sets, which, with another spit, and the loose mould, completes the covering. This is a good method, but not equal to digging the whole ground, on account of its being left whole for the succeeding crop ; but the crop of potatoes is generally good : for besides the dung, they have the turf below to spread upon, and are partly covered with that from the trenches ; so that they lye hollow, and in a rich bed.

Potatoes on Borders.

If you have any rough borders of fields, that were grubbed

up to clear away roots and rubbish the preceeding winter, it is very good husbandry to dig them regularly the beginning of this month, and dibble them with potatoe sets, by which means you are sure of getting a beneficial crop; for such places are generally very fertile, from the rotting of leaves and wood; and they will be left ready in autumn for carrying the earth on to the land, in order to level the border, and lay it down to grafs. Such points as these are much neglected by the generality of common farmers, and yet the profit of them cannot be disputed: they are much too fearful of every little expence out of the usual road, and think every shilling so laid out is loss. When some rich earth is thrown out of ditches, or mud out of ponds, it is very often left long enough for yielding a potatoe crop, which either will do in good perfection, but without ever being thought off for that purpose. These are objects, that a dilligent attentive man should always have in his eye, and he will assuredly find the profit of them.

Potatoes for Horse-hoeing.

The new husbandry has been much recommended for the culture of potatoes, and there have been many instances of great crops gained in this manner. The practice of it is various; but, in whatever manner, the land should be plowed on to ridges for them, according to the rows intended. They have been tried in equally distant single rows, at two, three, four, and five feet; in double rows, at one foot on four feet ridges; the same on five feet ridges, and three rows on five feet ridges. These methods may most of them have succeeded; but the wide distances between the single rows certainly lose too much land. If equally-distant rows were used, three feet must be preferable to the others; double rows on four feet I should prefer, and treble on five feet: in which methods you have the advantage of the horse-hoeing culture without losing much room. Equally-distant, at two feet, with a neat horse-hoe that turned no furrow, only cut the surface of the ground, would

would probably be very successful. The principle of introducing the horse-hoe, is to save some of the expence of hand-hoeing, and at the same time to make the crop flourish better. The advocates for this husbandry acknowledge, that there are more plants in the old method; but they assert, that the tillage of the plough is so much more effectual than that of the hand-hoe, and the admission of air among the plants so much freer, that the loss of number is more than made up in the gain of size. It has been said, however, that horse-hoeing is so effectual that there is no occasion for dung with it; but let all good farmers be very suspicious of such assertions. If they give up the benefits of rich manurings for any purpose so imaginary, they will certainly repent it. Potatoes may, in certain soils, be cultivated to profit without dung, but never equally; and on most lands it is absolutely requisite.

Cabbages.

There are two principal seasons for planting cabbage crops designed for cattle, viz. the latter end of April, and the beginning of May, and about mid-summer. The land for both, I suppose, plowed the first time at Michaelmas: if February was very favourable for tillage, another earth was then given if the teams had leisure for it. Those fields that were to be planted in April and May must, undoubtedly, be plowed again in March. These stirrings are not to be flat, but the land kept on the ridge by reversing. If you have as much time this month to spare from seed-earths (which are ever the most important part of tillage) as you will have in April, it will be also advisable to plow those lands that are for the mid-summer crop: by which means you will be sure to gain a fine tilth late in spring, which is the best method of destroying seed-weeds.

The beginning of this month is the proper time for sowing the seed: for this purpose you must proportion the seed, and seed-bed, to the intended quantity of your crops. A good rule,

rule, according to the account we have of this culture, is to sow one pound of seed to every four acres of land intended to be cropped. For a seed-bed, make choice of a rich piece of land summer-fallowed, and dunged with rotten stuff. If you design ten acres of cabbages, let the space be a rood, there is no occasion for any spade and rake work; the plough and harrow will do to the full as well. As to the sorts of cabbages, it is advisable to have the great Scotch, the turnip cabbage, and the green boorcole; and if your stock is various, as in general, you should allot the Scotch to beasts and cows, and for sheep to the middle of April, and the turnip, cabbage, and boorcole, for sheep alone, from the middle of April, to the middle of May; by which means you will have no trouble in providing for your cattle throughout the winter: the point of all others, which has most perplexed our farmers. But I should observe, that the cabbages, planted out in April and May, must be the Scotch alone, and they are to take the cattle from grafs, and carry them through till January. The directions given above, for sowing in this month, are relative only to the crop transplanted into the field at midsummer.

Turnip-fallow.

The land designed for turnips, I suppose to have been plowed from a stubble at Michaelmas; in this month it should receive the second earth, which is very necessary, that you may, by harrowing well, or by another stirring in April, if the land is stubborn, be able to make it so fine, as to insure a thick crop of weeds in May; a succeeding plowing turns them in, and quite destroys them. This is a method that is very effectual in destroying seed-weeds, and particularly suits turnip-fallows, as it is a crop that requires a very fine tilth, whether the land be foul or clean.

Sowing Clover.

March is a principal clover season for sowing with barley or oats, that succeeded either a fallow or an enriching fallow crop.

crop. The proper quantity of seed for an acre of land is twenty pounds. Many farmers sow much less; but it is a very faulty practice. There are two methods of covering it: one, by harrowing, when the barley is sown, and by rolling, when the barley is rolled after it is up; this difference is occasioned by clover harrowed in with the crop of barley, in wet seasons, very often spoiling it, from a too great luxuriance of growth.

In the management of a farmer's crop, he cannot give too much attention to clover. I do not think a better rule can be laid down, than sowing it with all the barley and oats on a farm. More of those crops should not be cultivated than proper to sow with grasses: if there is more, it must be from bad husbandry in second cropping. In farms chiefly arable, this necessity is so great, that, with a different conduct, a man can expect nothing but losses. In such farms, the dependence for the cattle is on this grass alone. What fatal effects, therefore must follow a neglect of cultivating a sufficient quantity of it! The farmer should consider well the profit of clover, before he sows spring-corn without it: the expences consist in nothing but seed, which scarcely ever amount to more than five shillings an acre. Now, what other crop can he sow, that will cost him so little? But the product is as considerable, when well managed, as that of any other plant mown for hay: it yields two crops of a great burden; and, in the feeding cattle, it much exceeds, for horses, sheep, and hogs, any common grass-land. But the great excellency of clover, is its cleaning and ameliorating the soil: if the seed is sown with a first crop of corn, while the land is in good heart, and free from weeds, you may keep it under clover from one to three years, and then break it up either for wheat or oats on one earth, and be sure of having an extreme rich, as well as clean crop of either; an object, considering the lowness of the expences, and other circumstances, of very great consequence. While the land is under clover, it is undoubtedly

ly fallowed only without the expence of common fallows. Of this fact, there cannot be a clearer proof, than the great crops of wheat gained after it on only one earth. Was clover an exhausting plant, should we see this so often? If any wheat-crops are peculiarly favourable, and generally successful to an uncommon degree, it is the clover land ones. Let therefore the good farmer take a resolution to sow no barley or oats without clover. If he religiously follows this maxim, and never sows it with a second or third crop, it is impossible his lands should be in bad heart or foul. So much of his farm will be under fallow-crops, and he will be able to keep such considerable flocks of cattle to raise manure at home, that his fields must always be in excellent heart, very different from those of his slovenly neighbour, who is eager after nothing but corn.

Sowing Ray-grafs.

This grafs is very valuable on several soils; but the cultivator should be careful of introducing it on improper land. Mixed with clover, it is of great use on most light soils; but on heavy, wet loams, or clays, it is as pernicious a weed as a farmer can throw on his land. On sands, sandy loams, gravels, or poor gravelly loams, &c. it improves the clover, especially when mown for hay: clover and ray-grafs hay, mown early enough, is equal to any. For feeding, its principal use is early in the spring, when the value is extremely great; for it is the first grafs commonly sown by farmers that shoots. With good management, you may, in general, command a fine bite for sheep and lambs by the middle of April, which is gaining a full month on any country in general. If the clover and ray-grafs be sown with a first crop of corn, the land clean and in good heart, it will be ready for the sheep by the beginning of April. The importance of such food is then very great; and should, on no account, allow of any undistinguishing censure of this grafs. It is an undoubted fact, that

that many parts of England would suffer infinitely, if the farmers were deprived of it ; and some of those parts are among the best cultivated parts in the kingdom. Ray-grass is frequently sown too thin : it is almost a maxim, that you cannot sow grass feeds too thick. If it is sown alone, four bushels an acre will not be too much : if with clover, twelve pounds of the latter, and two bushels of ray-grass will make a good covering.

Sheep.

This month most finish the feeding your sheep on turnips : if they are kept longer on them, the barley or oat crop will be ruined, and but little good results to the sheep ; for the roots, after the second branches are run, become hard and sticky : so that no cattle, unless very hungry, will eat them. About the middle of the month, therefore, you should manage to have the last of your turnips quite done, and put all your stock to cabbages, which are now in high perfection. The profit of this management cannot fail of being very great ; for the difference of keeping your fattening sheep, and ewes, and lambs, longer in a food grown very indifferent, and of which they are tired, or changing them to a fresh sort in full perfection, must be prodigiously great.

At this season the stock, whether ewes, lambs, or fattening sheep, must be kept extremely well. If they are pinched now, all the money before expended will be nearly thrown away. Turnips can no longer, with any propriety, be depended upon. If the farmer has not a great breadth of ray-grass, or some other grass, cabbages are his only dependence, and he must either possess a crop of them ready for this season, or sell off his fattening sheep sooner than he desires, and stop the growth of his lambs, at a time when they ought to be half fat. By the middle of April, indeed the natural grasses will afford a small bite, but feeding them at that season is absolute ruin to the crop of hay.

In fattening wethers, the great object is to keep from selling, till the middle of April, then to begin, and keep
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killing till the end of May, is the most profitable conduct; for the price a butcher will then give, much exceeds that of two or three months earlier. How advantageous, therefore, to have a field or two of cabbages ready to take all the stock by the middle of March from turnips; or if cabbages be the chief crop to have enough of them to last till May.

In the eating the crop, attention must be given to the soil: if it is dry enough, they may be eaten on the land much better than turnips; because they stand above ground; but if the land is wet, they should be cut and given the sheep on a small grafs field.

Cows, &c.

Throughout this month, keep your cows lean, and young cattle close to the farm yards: on no account let them wander over any of your fiels. If they even steal into a grafs field, and it be a forward spring, so that they get a mouthful or two of grafs, it will prejudice them not a little, for they will not be so well contented with their dry meat after: besides they poach the grafs, and you lose much manure; for these reasons, it is very adviseable to have all your yards (I suppose water to be in them) locked up, and then it will not depend on the memory of servants. Keep every place well littered with stubble, straw, or fern: Remember that your omitting this attention will be just so much mischief to all the crops of your farm in the article of manure.

At this season, a farmer who has weaned any calves, should observe that they are well and regularly attended; they should have a small yard with sheds to themselves, and have their bellies full of the refuse leaves of the cabbages given to the milk cows, with whole ones if they were not sufficient. Young cattle should be kept well, or they will come to a very poor size; their dry meat should be good hay

The Teams.

A diligent farmer will now see to his horses and oxen performing good days works. In sowing time, he should not let

Let them work less than ten hours ; but this he will not be able to effect, if the ploughman have to take care of their horses. It is best to have horse-keepers, for the mere attendance of the teams : so that the men, who hold the ploughs, may have nothing to do but the mere plowing. Let the horse-keeper have the horses fed and harnished ready for the ploughmen to be in the field by six o'clock : at eleven they should come home for an hour and a half to dine and bait, during which time, the horse-keeper is in attendance again. At half an hour after twelve, they should go out again and work till half an hour after five, when the horse-keeper should again take the teams, By this method, a pair of horses, in a well made plough will, without any driver, plow an acre and half very easily, and no object is more important than the plough's doing good day's work in the spring of the year. The consequence especially of making the most of dry weather in March is extremely great : one acre plowed and sowed then may be fairly worth two that are left till the beginning of May. From long observation of the value of dry seasons for tillage in this month, must arise the old proverb of " A peck of March dust is worth a king's ransom."

Water Furrowing.

In all new sown or plowed lands, as soon as a field is finished, let the ploughs, before they leave it, strike the water furrows, and send in men directly with spades to scower them, that is, throw out the molds ; in all lands, sown with clover or grasses among the corn, they should be dug a spit deep, and the moulds thrown carefully out. Many farmers are not attentive enough to this point ; they only scour the furrows ; but they should consider how long the grass is on the ground, which probably may be two or three winters ; and consequently it must be very material to the crop to lie dry all that time, which scowering alone will not effect.

ARTICLE XXVIII.

Of the culture of Potatoes—Two kinds of Potatoes recommended for Seed—Of draining Level Grounds.

[In a letter to the PUBLISHER.]

AGRICULTURE bringing more real riches to a kingdom, than the diamonds of Galconda or the gold of Peru; is it not then the business of the Legislature, to encourage and promote the study of that first of sciences? The Farmer is the support of his country: To defend and protect him is true Patriotism: To grieve at his prosperity, and regret the conditions of his tack, is rebellion to our King, and a breach of the laws. I have sometimes thought, that the knowledge of Agriculture, should be taught in our Universities, and that a Professor being instituted for that end, would be productive of the greatest advantages; and if the usefulness of the subject was laid before our beneficent Sovereign, every thing might be expected from his parental care.

Some time ago, I sent you two essays, one on the culture of Beans, the other on Potatoes [VOL. I. p.334.]. To the first I have nothing to add; but some part of the second, through the hurry of the corrector of your press, or my bad writing, is not so clear as it ought. In the planting the potatoes, I only use one line, marked at the distance of each foot; a man digs a small pit opposite to every mark; a girl drops a plant into every hole; the line is then shifted, and placed at the distance of two feet, and the earth taken out of the pits in the second row is put to cover the plants in the first, and so on through the whole field. In this manner, last season, I planted fifteen acres, at the very moderate expence of eight shillings each acre. I know not a greater improvement in the Potatoe culture, than the digging them up with the broad
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good grapes; it is cheaper than taking them up by the plow, and clears the land of the remaining root weeds, equally well with the most perfect fallow. I took up my whole crop in that manner, and my land left clean as I could wish.

I have tried many different kinds of Potatoes, but none as in any degree equal to the Royal Forrester, and Red-nosed Kidney: I brought these two kinds from England, and can truly say, they exceed, by fifteen bolls on an acre, every other kind I ever saw. They excell in taste, as they do in number. By our carrier next week, you will receive a parcel of each kind, to distribute amongst such of my brother farmers, as choose to call for them *.

In Article XX. of the first volume, you treat of water, as an impediment to vegetation, and mention, from Mr DICKSON'S very valuable book, the method of preventing it, [VOL. I. p. 147.]; but as he only points out the way of doing so, when there is a declivity to carry it off, allow me to inform you of a method I have found effectual, without any. In the farm I possess, different parts of the finest fields were rendered incapable of bearing wheat, or early spring-corn, from the water stagnating in the hollows. I had no declivity to carry it away. I tried to sink it, and the method answered my most sanguine wish. I knew the reason, why water lodged there, was owing to a clay bottom, below the soil, which prevented the water from draining off: All I had to do, therefore, was to find out in the field, a place nearest to the stagnate water, where under the soil there was a gravel bottom; I then took the level of the place where the water stood, and dug a drain from it into that part of the field, where the bottom of the soil was gravel: at the end of the drain I made a pitt, and filled the drain and it up with stones, &c. as a hollow drain, in
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* These two kinds of Potatoes, are received by the Publisher, and will be delivered to any Farmer who pleases to call for them.

the same way you recommend [VOL. I. p. 150.]. It effectually answered the purpose; for those parts of my farm, that before were in a manner useless from water, are now as dry, as any other part of the field: The expence is trifling, in comparison of the advantage. In this year I have saved more wheat, than will defray the charge I was at four times over. Withing success to your laudable and most useful publication,
I am, &c.

RUSTICUS.

East Lothian,
March 11. 1774.

A R T I C L E XXIX.

Causes of the Slow Improvement of Agriculture.

[In a letter to the PUBLISHER]

AGRICULTURE is an art which has been practised in every civilized country, for many ages, and by an infinite number of men: A few of them men of education and enlarged minds: A number of them men of sufficient natural sagacity and judgement to direct their conduct in other matters. It is an art, beyond all others, useful and important to the public; and every particular farmer has a strong spur, from his own interest, to follow the best and most profitable practices. When one considers these things, he might expect, that this practical art would have mounted, long before this time, to its highest pitch of improvement, rising step by step upon the firm basis of the experience of so many ages; at least he may wonder, that, after the infinite number of different trials, the discoveries have been so few, the improvements so small and so slow, and that so many evidently absurd and unprofitable methods of farming continue to prevail, in this, and in all other countries. This appearance has often struck the writer of this letter, and doubtless many other thinking farmers.

mers. He has thrown together a few plain observations, which will in part account for it, pointing at those obstacles to the improvement of farming, most general and extensive in their influence : If his observations are thought of any consequence to remove them, when they can be removed ; to correct men's prejudices, lead them to a more rational and liberal way of thinking on this subject ; and to quicken the improvement of practical farming in this country, which is the professed object of your publication ; you are most welcome to them : If they do not appear to have this tendency, they may be thrown aside, without giving the smallest offence, I assure you, to the writer of them.

Agriculture, considered even as the business of the common farmer, is a more complex art, and consequently more difficult in practice, than is generally imagined. The manufacturer, the common mechanic, the shop-keeper, perpetually poring upon the same objects, and repeating the same manual or mental operations a hundred times every day, may soon bring their respective arts to the utmost pitch of improvement of which they are capable. But the farmer, besides his manual operations, has a more extensive sphere of action. A considerable variety of objects and operations come within the plan of every ordinary farm, and require both judgement and activity to conduct them properly. Besides, the state of his cattle and the various instruments of husbandry ; the variety of soils to be found in most farms, different in their quality, different in their state, vigorous, exhausting, &c. the different kinds of grain or grass best adapted to these soils ; also the variety of manures and different ways of culture ; the quantity and quality of the seed, the proper times of sowing, the timing all his other operations in such a manner as to give the least interruption to one another ; the succession or rotation of different crops ; the climate, the changes of the weather and seasons : These, and an infinite number of other interfering circumstances, come within the consideration of the farmer, and must be examined
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and decided upon every year, for himself, in the best manner he can. To ballance and adjust all these things to one another, and to his own particular purposes, and to manage his farm in a proper manner on the whole, requires a degree of attention, judgement, and candour, seldom to be met with in those who pursue this business for a livelyhood, and a degree of practical knowledge, derived from experience and patient perseverance, seldom to be met with in those who pursue it chiefly for amusement. Hence the advantage of small farms ! Hence the yet greater advantage, of introducing judicious methods of farming into a country ! Once fairly established, they acquire an authority from custom and example : the farmer goes on in the common routine, as he sees others do before him : he is saved much thought and contrivance : he is saved the exercise of his own invention and judgment, which is very troublesome to many ; yet he can never in this respect be brought upon the same footing with the manufacturer or the common mechanic. No offence, however, to those useful men : Their industry is no less necessary to the welfare of the community than his.

But as custom stamps a credit upon such practices as are wise and useful, it stamps an equal credit upon such as are less so, such as, compared with the former, are absurd and useless. Many practices in farming, that were, perhaps, judicious when they were first introduced, ought now to be given up, for others yet more judicious and profitable, and more adapted to the present improved state of the country. Yet many who follow those practices are unwilling to give them up. This looks like acknowledging themselves in the wrong in their former conduct ; and why will you be so reluctant to make such an acknowledgement ? It is only saying, that you are wiser to day than you were yesterday. Here, however, is another powerful obstacle to the improvement of farming ;--Prejudices, attachment to systems of it which men have embraced, it matters not much whether they be old or new systems. This, indeed, has given a fatal check to most attempts which
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have been made, to make men wiser and better; it has been a heavy clog upon improvement, not only in farming, but in every other art, in every science, in philosophy, in religion. I say, narrow prejudices, and blind attachment to system, has shackled the minds of multitudes of men, even in the most civilized countries, and kept them too long under the power of ignorance and barbarity.

The lower farmers are attached to the systems of farming they have received from their forefathers, sanctified by antiquity, and rivetted by custom. Seldom will they be prevailed upon, to venture out of their own narrow circle, to depart from the prevailing practices of the country where they live, to try the better practices followed in a different part of the country, or to try a hundred little experiments, which yet they might do without any trouble or risk. In this respect they have been much complained of, and surely not without reason. For however natural and innocent their attachment to their old practices may be; yet it is the chief thing which prevents the introduction of better practices; it is the chief obstruction to the improvement of the country. The writer of this feels a sincere compassion for this class of men. He is sensible that their attachment to their customs, is much owing to their narrow education, and unfortunate situation in life. And without education, the state of both the higher, and lower ranks of men, must have been much worse than it is. But he cannot vindicate such of them as still continue to follow the prejudices of a wrong education, after they have had full opportunity of having them corrected. Had we followed the footsteps of our forefathers in every thing, what would we have been at this day, but Heathens and Barbarians!

And why will men, to whom God hath given a portion of reason, follow any opinion or practice blindly, without giving themselves the trouble to think, whether it is right or wrong? Why will they continue blind, not only to reason and truth, but to their own evident interest? Why, for instance, will they

they continue to plow and sow their outfield grounds, when they themselves acknowledge, that these grounds seldom compensate them for seed and labour? Why will they refuse to sow their lying fields with grass-seeds, when they cannot but see, that an acre, laid down in this way, goes further than two or three acres without it? Why will they continue to plow in some places with six, in others with four horses, when they see before their eyes, that two horses, at least in all level grounds, will do the business equally well? Or continue to cultivate a rood, or half a rood of Potatoes with the spade, when they see that an acre or two can be done by the plough with a third part of the time and labour? It is not indeed to be wished, that common farmers would take the lead in making new experiments, or introducing new practices. But when gentlemen of education, sense, and candour, have done this to their hands, have brought the practices of experienced farmers in distant places of the island to their own very doors, and shown these practices to be unquestionably superior to their own, by repeated successful trials; why will they not follow them? Nay, why will they behold them with the sneer of stupid ignorance and bigotry, and treat them with scorn? When men continue in ignorance for want of the means and opportunities of better information, they are to be pitied and excused: but when the means of information are within their reach, before their eyes; to neglect them, to scorn them, to shut their eyes against the clear light, this is not to be excused in any set of men.

On the other hand, though the country is highly indebted to many gentlemen and actual farmers of a superior class, who have, at a considerable risk and expence to themselves, introduced a more rational and spirited culture, than the common, upon their own farms, though we are much obliged to them for their many successful trials, and not a little even for their unsuccessful trials, and the instruction as well as warning we have derived from these; yet it is not to be dis-

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sembled; that a considerable number of them are under the power of prejudices, that the interests of practical husbandry have suffered, and its improvement been much retarded by these. Farmers of this class, are indeed sufficiently divested of the prejudices of education and custom, from their hearing of, or seeing the different methods of farming, that prevail in different places of the island, and in this respect, have a great advantage above the ordinary farmer. But many of these ingenious cultivators discover themselves under the influence of prejudices of another sort, blindly attached to fanciful theories and systems of farming, which they have embraced from reading or conversation, and which they are exceedingly loath to give up. One of your correspondents observes, with a mixture of simplicity and shrewdness to this purpose, for I cannot find the passage, That it seems to be their aim to teach farmers, not how to raise a good crop, but rather how God Almighty makes plants; a point which he justly presumes they will not soon be masters of. How much have we read and heard of the vegetable food and pasture, of fire and sulphur, and oils, and salts, and nitre, and acids, and many other things existing in an invisible state, in the different manures we employ, in the different soils, in the air, and every where, entering from thence into plants, and promoting or obstructing their vegetation. What, pray! can a farmer learn from these things, or from any reasonings founded upon them? Not to say, how remote such theories are from all the ideas of simple and illiterate men, it appears to me inconsistent with any sound philosophy, to mix chymistry and farming together, and to reason from the one to the other in the manner that is commonly done. The two arts are different in almost every thing. The processes of the chymist, and the changes produced upon dead inanimate substances, by mixing, compounding, and decomposing them; and the secret wonderful process of nature

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ture, in the nourishment, growth, and life of a plant, have scarce any thing in common; so that no conclusions can be drawn from the one to the other, of much consequence to a farmer. Take a piece of bread or flesh, put it into a retort, extract its oils, and salts, and earth, and water, and fixed air, and every thing else contained in it; and after you have destroyed its sensible qualities, try if you can discover by this means, whether it will be palatable to the taste, wholesome or hurtful to the stomach; and will you ever by the same means discover, what is nourishing or hurtful to plants, about which, after all our searches, we still know much less than about the human body.

Ingenious men have certainly a right to amuse themselves in any innocent manner they please; and when beyond amusement, they think themselves prosecuting some point of importance to mankind, much more are they entitled to pursue their speculations to any length, even though they should deviate never so far from truth and nature. Yet it is a little unlucky, when professing to instruct men in a practical art, they happen, with the very best intention, to mislead them,—to lead themselves and their followers into schemes, useless, expensive, hurtful to their fortunes, and to the interest and reputation of the art! When, for instance, they teach the farmer to throw aside, in a great measure, his seeds and his manures, and to trust entirely to culture, to sow only a very small part of his best cultivated fields with wheat or barley, to continue his culture still at a high expence, and after all to expect a profit equal or superior to what would have arisen from sowing the whole field! Yet I believe, the most romantic flights of the drill husbandry have turned out in the end to the advantage of agriculture, by teaching sober farmers a lesson which they would not have learned so soon, even to apply this high culture, along with manure, to such roots and plants as it is really adapted to, and where it brings a considerable profit. Yet in proportion as men are fond of any particular theories or systems

systems of farming, their notions and their practice will be confined within this particular tract : Facts and appearances, which support this favourite theory, will be eagerly attended to; while numberless other facts and appearances of nature, in this extensive field of knowledge, will be in a great measure disregarded, and few trials or discoveries made from them. And indeed it is to be regretted, that while the common farmers are attached blindly to the old system of their fathers, many of a superior rank and education should attach themselves too fondly to new theories and systems ; and but a few of both be found, so humble and so candid, as to submit to learn, from the simple and slow, but the only sure guide to knowledge, even an attentive and patient experience.

As farming is entirely a practical art, consisting of a collection of experiments or discoveries made at different times and in very distant ages, the experiments in it are more tedious and precarious, and consequently the conclusions drawn from them more uncertain, than in any other art : And this is another cause of its slow progress and improvement. Every experiment or trial in agriculture takes a season at least. Every farmer must wait so long to see the effect of his trial : Nay, he must often wait for several seasons, to see the full effect of some manures, of a proper rotation of crops, and of many other important trials in the course of his business. This requires patience and perseverance. It requires also a great accuracy of judgment to know the effect of his experiments, to make proper deductions, and to draw just conclusions from them. For all conclusions in farming have a considerable uncertainty in them ; because the success of every experiment depends, in a considerable degree, upon the seasons, the weather, than which nothing can be more uncertain ; and upon a variety of other causes and circumstances, which have an influence on the crop ; such as the seed, the quality of the soil, manure, culture, the beneficial or hurtful influence of the former crop. These different causes are always combined together; they act in

in conjunction, in producing the single effect; and it is impossible for the most experienced farmer, to ascertain their influence separately, or their different proportions to one another; that is to say, it is impossible for him to know for certain, to which of those causes the success or the failure of his crop was owing, and how far each of them operated in concurrence with, or in opposition to the rest. Every one knows, that the effects of lime, dung, and culture, are very different upon different soils, in a wet or dry season, on clean or foul, on fresh or worn out grounds. The effects of lime, dung, and culture, are probably much greater when combined, than separate; these causes assisting one another: On the other hand, it is probable, that some manures and operations in farming counteract one another.

The seasons alone have such an influence, that the best judges are tempted sometimes to cry out, That good weather is all in all to the farmer. How different the produce of a hay or pasture field in a cold and dry, or in a warm and wet season! Here no other cause seems to operate, but this great cause. Yet a dry and warm soil, suppose a perfect sand, by causing the grass-seeds to spring early and cover the ground, will raise a prodigious crop of hay in a dry season, and counteract the influence of a severe drought, which will scorch the crop of hay on a colder and later soil, and make it worth nothing: An effect which an unexperienced farmer would scarce expect from such a cause beforehand. And though in crops of grain, the influence of culture and manure does in some sort counteract the unfavourable influence of seasons, yet they cannot render the farmer or his crops independent of them. But as the seasons are the same to all; will not a well manured and cultivated field always yield the best crops? It has doubtless the best chance. It will generally do so. But if, instead of a general, you make an universal conclusion in its favour, and expect it will always do so, this expectation will be contradicted by experience. When the later end of the season is

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warm and wet, (and we had a course of such seasons two or three years ago) the fields, under the highest culture and manure, will suffer most from the lodging and rotting of the weighty crop, and yield a produce inferior to fields under a lower or more ordinary culture.

But the produce on the same field, manured and cultivated in the same manner, varies ; not only from the general quality of the season, dry or wet, cold or warm, early or late ; but much more from what we call in Scotland the *tid*, the particular fortunate season when the seed is sown and harrowed, the ground plowed, or any other important operation performed. And perhaps the chief superiority of the good to the bad farmer is, that the former times his operations in such a manner as to be able to catch these tids, and make the most of them. Yet this is often not in his power entirely. When the seed is springing, it is then in its most tender state, and probably more affected by the weather, than afterwards. The seeds of the annual weeds, from which not a thousand part of our grounds are sufficiently cleaned, are in the same tender state with the grain : and whether the grain or the weeds will prevail, depends chiefly on a fortunate or unfortunate tid at sowing, and for a month after. The shooting of the wheat, barley, and oats, and the flowering of beans, peas, and potatoes, seems to be another critical season, by which the crop will be much affected. Fifty other uncertainties or variations from causes, beyond the knowledge and power of the farmer, might be mentioned.

The result of these observations, is not, that we should turn sceptical in this important branch of knowledge. By no means : But only, that we should be slow, cautious, and careful in our conclusions.—That no general conclusions should be made from particular experiments in husbandry, till these experiments have been repeated often and often in different circumstances, and the effects attentively observed by an accurate and candid mind.—Another thing follows from this observation

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joined with the first, that it is not so easy a matter to be a good farmer as is generally imagined. It is impossible to start into the knowledge, much less into the practice of it, all at once. Let no young practitioner however, let no gentleman be discouraged from the attempt. He may spend his money perhaps more agreeably, but he can never spend it more innocently, and more usefully to the public; and if he strikes into a proper tract, I will venture to say, more profitably to himself. No solid knowledge of any kind can be acquired, no valuable acquisition made, without labour and difficulty. He wants experience. Yet if he has attention, good sense, and candour, he will soon acquire it. With these qualifications, he will gain more practical knowledge and experience in a few years, than the stupid or prejudiced farmer will gain through the course of a long life. Let him not trust his own theories and fancies, or those of others. Let him try all things, and hold fast that which is good. Let him trust rather to the judgment of the wise and experienced farmer. In this walk of life, they are generally abundantly communicative of their knowledge, and of the grounds of it. But how shall he know the best and most experienced, when he is without experience himself? Nothing is more easy. The tree is known by its fruit. The best farmer is always, he that raises the best and most profitable crops.

Another great cause of the slow improvement of farming, is the want of attention to local and peculiar circumstances. All good husbandry is local, or suited to the place where the farmer lives, to the climate and soil which he enjoys, the access he has to manures of different kinds, the market or demand he has for the product of his grounds, and fifty other things which are peculiar to his situation, and seldom concur in any other situation. The times of plowing and sowing, the grain he raises, the culture he bestows, and many other parts of his management, must be regulated by these. As to climate, whatever difference there may be upon the continent,

I do not apprehend the difference so great in different places of our island as is commonly represented. Potatoes thrive admirably in our cold climate, yet I have been assured it is impossible to raise them by any management in the happy climate of the south of France. The climate of the south of England may be so far superior in point of heat, as to bring some plants and seeds to a perfection, which they cannot be brought to, in the northern parts of the island; yet, in general I would not incline to lay so much stress upon this single point, as some judicious and experienced farmers seem to do. There is little ground to think, that the climate in the East and West of Scotland is so different, as to dictate a different time of sowing, or a different kind of husbandry, grass and tillage husbandry, on the two sides of the island. A course of wet and dry seasons makes a far more material odds to farmers, both in the East and West, than any small difference of their respective climates; and from any observations I have been able to make, the seasons, whether wet or dry, cold or warm, are very similar in their general course all over the island. Let any one, who has kept a register of the weather, compare the seasons in Scotland, during the 1762, 1764, 1765, 1766, and 1767, with the notes of the same seasons in the South of England, found in Mr Young's experimental husbandry, and he will be convinced the difference is very inconsiderable. The greatest difference I have seen in this point is, that some climates are more cold and stormy, or rather some situations more exposed to storms, than others. The wise farmer will adapt his seed and other parts of management to this. In oats especially, there is a great variety of different kinds, and some of them much more fitted to bear rough weather than others.

The soil is another local circumstance, which calls for a much greater variation of management from every judicious farmer than the climate, and will oblige him to pursue a plan of manure, culture, and crops, not only different from his neighbours, but different from himself, I mean a variety of plans, suited

suiting to the variety of soils in his farm. Yet how little variation is commonly made in the application of manures and culture, to the different soils of a farm! The only variation attended to is, in the seed or grain; and even in this men suffer themselves to be guided more by a blind attachment to established rules and systems, than by fair trial and experiment. It is an established maxim, that beans will only grow on a stiff or clay soil. Such a soil, under good manure and culture, I take upon the whole to be the best of all soils for them. Yet I have seen many clays where they will not grow at all. Besides, it is sometimes, often indeed impossible to throw them into a clay soil so early, as to secure a good crop. RUSTICUS says, and I can say the same from experience, that good crops of beans may be raised on any soil in heart, except gravel or sand. [Vol. 1. p. 247.] Look into the garden, and see what crops even of the largest kind can be raised upon almost every soil. Many Scots and English farmers maintain, that barley, and bear which they call big, will answer equally well on the same soil, with the like culture and management, and that the last, being an inferior grain, ought to be banished from the grounds of every good farmer. The conclusion would be just, were the fact true; but our common farmers know, from trial, that it is not. I myself have fondly attempted to raise barley for many years, and could scarce ever attain to a middling crop; yet, in the same soil and season, with less manure, have raised very great crops of bear; and there are soils near mine little different to appearance, where barley will grow in perfection.

It has been said, that the soil and climate of the West of Scotland is unfavourable for wheat. I believe this prejudice has prevented ten thousand trials of it. I believe also, that our soil in general is not so rich as the soil of the East. Yet we can produce old rentals, from which it appears, that many chalders of wheat were annually paid to Monasteries, three or four hundred years ago. We can raise, at this present time, very good crops of both winter and spring wheat. Yet another

other local circumstance is a standing discouragement to the culture of this best of all grains, there is no regular market for it, and few milns being as yet erected in the West by public spirited gentlemen, the farmer lies much at the mercy of the baker in the sale of it.

How favourable are some soils, beyond others, for grass seeds? There are many clays, and also a few light dry sandy soils, where scarce a stalk either of red or white clover will grow, with any possible manure or culture.

But why do I wander into such a detail? The point I meant to illustrate and inculcate was, That all judicious and good farming must be local; That the good farmer is obliged to adapt his seed, culture, and the whole plan of his management to the variety of his soils, and to many other peculiar circumstances in his situation, which have not been enlarged on; That this variety or diversity of soils and situations is great and endless, and therefore, no general rules can be laid down in this art, at least very few, which will suit every particular case; no general plans of culture and management, which will answer you, or me, or any other farmer in his practice: You may divide his soil into clay, and loam, and moss, and gravel, and sand, and different mixtures of these, and give him good rules for the management of each of them; but his clay, and loam, and sand, may happen to be exceedingly different from yours: And he never can know the nature and quality, or rather the effects of his soil, by looking at it, by its colour, appearance, feeling, by any chymical experiments upon it, or rules laid down beforehand, to distinguish it from other soils. He must try it as a farmer, in his own way, and see what it will do, what it will bear, what grain, manure, and culture, will best agree with it, and form his own plan of management accordingly.

But does not this cut down the utility of all books and instruction on this important branch of knowledge, and of the Scots

FARMER among the rest, and reduce the whole art to mere experiment, what some will call mere quackery? I am so far from thinking instruction useless to the practical farmer, that I think he has more need of it than most other men. And there are few books, except such as are wrote by mere theorists whose farms are confined within the bounds of their paper or their chamber; I say, there are few books, where the instruments and operations of husbandry are described, plain rules laid down, and the experiments, the foundation of these rules, detailed, with any proper accuracy and candour, from which the most judicious and experienced farmer may not draw some hint, some instruction, that will be useful to him in his own practice. And I support this assertion, and reconcile it with what was formerly said, by observing, that though in all farms there is an endless diversity in some circumstances, yet there is a great similarity or sameness in others; and whenever a farmer finds, not from theory and fanciful guesses, but from actual trials, his own soil and situation similar, or nearly similar to that of any other more judicious farmer, he may derive much benefit from his more enlarged knowledge and experience. The personal experience of every actual farmer is, and must be, very limited. How few the trials he can make himself, compared with the infinite number of trials that have been made? And what an advantage to him must it be, to have his own prejudices corrected, his knowledge and experience enlarged, by that of others superior to himself, in attention, in judgement, in fortune, in the means and opportunities of acquiring knowledge? Though he may be so vain as to think his own knowledge superior to theirs, in some, perhaps in many points; yet it will be strange indeed, if they are not able to give him instruction, in other parts of this extensive art, with which they are better acquainted than he; strange, if something or other in their management and plan, may not be adopted by him, as an improvement of his own.

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or accommodated with some small change to his situation, or may suggest some useful hint, or put him upon some trials that may lead to a discovery of ten times more consequence to him, than any trifle of money, time, or thought, he may throw away, in the perusal of their writings. But they may mislead him. Yes, they may. Yet he has chiefly his own ignorance and rashness to blame, if he follows any wrong scent. Why will he not make due allowances for their prejudices and mistakes? Reject what is fanciful: Neglect what is useless in itself, or useless to him: Select what is likely, upon trial, to prove useful, profitable, and proper to his peculiar situation; and, like the bee that gathers something from every flower, gather some new light, some instruction and experience, from every quarter.

On the other hand, if any person shall fancy, that reading or conversation with intelligent farmers, will ever make himself a farmer, without practice; if he shall observe the rules given him, and adopt the plans of management that have been successfully tried, by the lump, and adhere to them, invariably, expecting the same success, without regard to his own different situation, he will be miserably disappointed. But if he compares the climate, soil, and situation of other farmers with his own, tries their plans with proper alterations and deductions, where the circumstances are not similar, and tries them at first with caution, and upon a small scale, where the circumstances appear most similar, and the prospect of success most flattering, and adheres only to such parts of them as will stand the touchstone of his own trial and practice: such a farmer will find the experience and observations of others, of use to himself, in a thousand instances, both in the way of warning and instruction. His own candid judgment and experience is however the main guide, you see, he has to trust to, without which, he can make no good use of the experience of others, nay, in many cases will be much hurt by it.

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This leads me to mention one other thing, which has much retarded the improvement of farming, even that farmers are at no pains to collect and record their own experience, or the result of it, with any sort of accuracy; the consequence of which is, that in a few years, it is almost forgotten, even by themselves, and much more by others. Suppose a farmer has sufficient sagacity, to see his own, and his neighbour's blunders, and attempts a better practice, in some instances, yet the success or failure of his attempt he does not sufficiently remember and build upon in future trials, so as to make it the foundation of a further and further improvement. If indeed his success has been remarkable, he continues the practice for a few years; till a succession of two or three unfortunate seasons, or some other cross accident, makes him weary of it, and fall back into the routine practice of the country.

If farmers go on, like their cattle, in the beaten track of the country where they live, it is of no consequence to themselves or others, whether they record their experiments or not. For they are only such experiments as have been made again and again, a hundred thousand times, and the result of them is fully known. But there are many gentlemen, and a few actual farmers, who have a proper portion of the spirit of discovery and enterprise, who do not confine themselves to any beaten track, either old or new, but see much room for improvement, and are not afraid to attempt it, wherever they see an opening that leads to it. It were much to be wished, that such farmers would take the trouble, chiefly for their own sakes, to keep some book, or register by them, and mark in it the quantities of grain, sown and reaped, upon all the different inclosures in the farm; the times, and any other material circumstances, respecting the tillage-husbandry. This could be done with the least trouble imaginable, upon half a sheet of paper, divided into columns, in the following manner, or

in any other more regular and perfect manner the farmer may contrive at his leisure.

Grain	Quan. of seed bolls B.	Ground acre R.	Sown	Reap.	Stack.	Threaves	Produce
Wheat	2. 1.	B. A. 2. 1.	Oct. 1.	Aug 25.	Sep. 5.		Bolls bush. 20. 2 nearly 9. per acre.
Barley	3		Apr.				
Siberian Barley	}		Mar.				
Beans							
Oats, &c.			plant.	howed	digged		
Potatoes &c. &c.			Ap. 1.				

In the first column to the left hand might be inserted the quantity of seed. In the second column the initial letters of the park or inclosure, together with the extent of the ground upon which it is sown in acres and roods. In the third the time of sowing. In the fourth the time of reaping. In the fifth the time when it was carried into the barn or stack; and this, compared with the former, shows how long it stood in the fields, according to the favourable or unfavourable cast of the harvest. The sixth column the number of threaves. And the last column the produce in bolls, with room to mark the proportion of this produce to the seed, or the acre, or any thing else worthy of note. The farmer has no more to do, but to fill up the columns of sowing, reaping, &c. the same day the fact happens, and he has before him at one view the most material circumstances of his tillage husbandry. He might, if he pleased, insert two other columns, exhibiting the number of plowings given to the field, and the carts of lime or dung, &c. laid upon it.

Another page of his book might exhibit the state of his hay and pasture enclosures, for which three or four columns might be sufficient. Another larger schedule might exhibit in a very small compass the winter transactions.

The different mows or stacks 1st, 2d, 3d, with the number of threaves contained in each, might be ranged below one another, like the wheat, barley, and two lines drawn from them

to the end of the page, in which every quantity thrashed from them might be inserted as soon as it was measured, and when the stack was finished, the total carried forward to a column on the right hand of the page.

I only suggest these things to the actual farmer, unexperienced in book-keeping, to save him the time and trouble (as his time is often precious) of minuting his various and complex transactions every day in a journal as they happen, which I know some judicious farmers do, and ranging them afterwards in a regular book. But by recording them at first in this regular manner, or according to any other more perfect scheme which might be easily contrived, he may comprehend all that is necessary to be remembered by himself in two or three pages, and this at the expence of the twentieth part of the time and labour necessary for the other.

But besides this, every farmer, who has got any education above the common, will find it useful to keep something like a journal, consisting of a few jottings, if it were but once every week or fortnight when he is most at leisure, particularly some account of the weather, not for every day in the year, which would be useless to the farmer whatever it might be to the philosopher, but as it runs in courses of weeks, fortnights, months, &c. dry, rainy, stormy, frosty, warm, cold, variable, &c. together with any thing remarkable in the course of the winds as connected with the weather, or any thing remarkable in the rising and falling of the barometer (if he has one) whether the changes of weather from one set to another does not fall cut a day or two before or after the new or the full moon, which will be found generally the case. Or if they be connected with any other signs known to himself or his neighbours in the part of the country where he lives. The effects of the weather upon the grass or grain ought to be carefully observed and noted.

But much more ought the farmer to minute his principal operations in the field, any thing worthy to be remembered during

during the course of the year in his management of his different sown fields, the manure and culture bestowed upon them, the time this was done, the effects of it, how far it has answered his own expectations, the most probable causes of his success, or want of success, that, if they depend on himself, they may be repeated or avoided in the next trial, especially in any new experiments he makes. The whole necessary operations should be minutely described, the expence of them calculated and fairly stated, and the success or failure, the profit or loss on the whole, faithfully recorded.*

The trouble that such a register will cost any person who has learned the use of his pen is next to nothing. The advantages of it, at least if his farm be at all an object worth his attention, are many and great beyond what he can imagine without the trial. It will give him an ease, order, and accuracy in this business, which it is impossible he can have without it. It will in most things be an effectual check upon those under him, or with whom he has any dealings, by rendering him, not only equal, but superior to them in their own business. Accustomed to habits of attention and accuracy, he will acquire in a few years a facility and acuteness of judging, even with his eye, in the most material articles, which they will not acquire in their careless inaccurate way, through the whole course of their lives. And if any young farmer thinks he has little use for such an acquisition, and expects at present in this walk, the *Nescia fallere vita* which Virgil pictures as a characteristic of it in his time, I shall only say, that he may happen to be disappointed.

Let me add, as the main purpose for which I recommended this practice, that it is the shortest and surest way, perhaps the only way, to arrive at that practical knowledge and experience
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* The writer of this has kept such a journal, rather more full and accurate than here described, for eleven or twelve years past, and he has often regretted he did not begin it much sooner, even as soon as he began farming.

in the art, which is of more consequence to his success than all other qualifications put together. How is it possible he can gain much knowledge or experience, if he has no distinct views of the result of his own experiments or trials; if he only makes guesses, often wide of the mark, and does not ascertain them by number, weight, and measure, and remember them afterwards? How is it possible he can know the different soils or qualities of his grounds, and the different grains and manures best adapted to them, if he does not ascertain the quantity and value of the different crops growing successively on the same field, by a fair comparison; and also the comparative expence of the different manures or culture he bestows upon them?—But I am ashamed to insist on so plain a point: The utility of the practice will be acknowledged by all: And yet, through I know not what infatuation, if it is not the infatuation of indolence and carelessness, it will be followed by few. Let these few go on however to state, every year, the principal facts and circumstances of their farms before their own eyes, and they will find themselves acquiring a facility in this difficult and complex art beyond their hope, growing wiser every year, both by the errors and successes of the former year, learning many lessons, catching many hints, which would have otherwise entirely escaped them, that will be of great use to them in their future practice: And let them if they please compare the result of their own experience and practice, with that of their friends in the same walk of life, for they will probably think them unworthy of the public view: A few such registers, kept in a particular district where the seasons, soil, and other circumstances were nearly similar, and compared together, would suggest some general rules and maxims, and lay the foundation of a more judicious and successful practice in that part of the country.

The above is what has occurred to me, as to the most general causes of the small and slow improvement of husbandry. The letter has swelled to twice the length I intended: Perhaps you and your readers may with the thoughts had been contained

contained into a narrower compass ; yet there is no writing intelligibly on a general subject, without running into a detail, and touching some of the most important particulars, to which the general observations and reasonings are applicable, and what appears tedious and trite to one, may be useful and absolutely necessary to make the thing understood by another. There are many other more particular and local causes of the slow improvement of farming in Scotland ; such as, The high rents, in most places quite beyond all proportion to the present state of improvement in this country ; The shortness of our tacks. Both these, instead of being a spur, are a wretched clog upon the industry and ingenuity of the farmer. Why should he labour beyond what is absolutely necessary, when he has scarce any hope of reaping the fruit of it ?—The issue of our tacks, at a precise and certain, instead of an uncertain, term.—The poverty of the greatest part of our tenants, which incapacitates them for any vigorous and spirited efforts at the beginning of their leases. When the tenant has a small stock, and is at the same time industrious and intelligent, the master should bear some proportion of the expence of any judicious improvements, and at the same time make the rent up in such a manner as to pay him 6 or 8 *per cent* for the money he lays out, during the tack of which the tenant reaps the benefit, and the additional value of the ground at the end of a nineteen years tack, will more than indemnify him for the sunk capital.—The largeness of our farms, almost all of them too large in proportion to the stock and industry of the tenant ; the outfield ground especially, is a dead weight upon him, and in most cases he would be better quit of one half of it. These, and many other obvious causes, I have said nothing of, because they are already

treated of with great justice and delicacy in the Introductory Essay to the SCOTS FARMER *. [VOL. I. p. 1.]

I:

* The writer of this letter, as far as he knows, is an entire stranger to the writer of the essay he refers to, and indeed to all the managers of the Scots Farmer, except five minutes conversation he had with the Publisher. He thinks himself therefore at liberty to express his opinion of that introductory paper, as a piece of composition that does honour to the SCOTS FARMER, by standing at the head of it, and does much honour to the genius and humanity of the writer of it. He wishes to see his pen employed oftner, than he thinks it has yet been, during the course of this publication. With respect to the historical part of that Introductory Essay, he begs leave to observe, that there is good ground to think there was a period of improvement in Scotland, which, though a short one, was superior to any former or succeeding one, except the present. It was during the Usurpation of O. CROMWELL, and continued to some years after the Restoration.

During the civil wars in England, it is more than probable that many English families retired from the scene of confusion and bloodshed in their own country, and settled in the low country of Scotland, which continued in tranquillity, except the single and short shock given by Montrose's army. But during the reign of the Protector, an English army lay in Scotland, sometimes to the number of many thousands, every common soldier of which received his regular pay of 8d a day. This poured a flux of money into the country. Farming was then in a low state in England, but in a still lower in Scotland; for however rapidly we follow them at present, we were then more than a century behind them. The Dutch and Flanders husbandry was introduced into their gardens and parks, and their fields were under much higher cultivation than ours. And is it to be thought, that our farmers would learn nothing from the English yeomen, which chiefly composed CROMWELL's army, and were men of the same sober and religious

It would gratify many of your readers, if, besides Mr DICKSON's directions which are excellent, some of the managers

religious cast with themselves? But the point does not rest on conjecture; it is supported by many facts. The old rentals of several estates in the West show, that many farms were set higher during that period, than they were 30 or 35 years ago. The large fines exacted and paid by country gentlemen, and their tenants, during the succeeding reign, comparing the value of money then with its present value, would almost tempt one to think, that both were in a wealthier state at that time, than ever they have been since. There is a tradition that can be depended on, however incredible it may seem, that in three parishes in the West there were many ploughs worth 1000 merks. They plowed at that time with 6 horses, and the breed of work-horses had been much improved by a great importation from Denmark by King JAMES VI. There are parts of large inclosures standing at this day, made by Cromwell's soldiers, stone-dikes near six feet high over tracks of country; many vestiges of old inclosures in the common way; attempts made, to drain lochs by long and deep canals, at a great expence; and many other marks which it would be tedious to mention, of a spirit of improvement, which, I have no doubt, began to stir during that period, and even rose to some height. But the succeeding scenes soon obliterated the very memory of these things. The dreadful exactions, imprisonments, and other oppressive measures pursued by those in power, equally contrary to sound policy, as to justice and humanity, not only impoverished, but even desolated large tracks of the low country of Scotland, especially the western counties, drove the indignant gentlemen, and many of their wealthy tenants and dependants, in crowds, into Ireland, England, Holland, and almost every foreign country, and extinguished any sparks of the spirit of industry and improvement in the breasts of those who were left behind. A succession of five or six years of dearth, soon after the Revolution, completed the ruin of this miserable country; so that it was not till many years after the Union, that the face of it began to change.

nagers of the Scots Farmer would take the trouble to give us in a few pages, the result of Mr YOUNG's experiments, on wheat and barley in the broad cast way, as contained in different places of his experimental husbandry; that is, to give us in quarters and bushels the produce and profit of two or three of his best, as many of his middling, and of his worst crops, with the expence of manure and culture per acre, and the same of beans, peas, oats, potatoes, carrots, clover, and saintfoin; also the result of his experience with respect to the time and quantity of seed. I mean, that you should inform us in a sentence or two, what he judges from tryal to be the most proper time of sowing wheat, barley, beans, &c. &c. and to be the most proper quantity of seed per acre. It would be obliging, if any of your correspondents would account for the fact, that barley is sown very early in England, and very late in Scotland.

Feb. 8th, 1774.

TITYRUS.

T H E

SCOTS FARMER,

MARCH 1774.

ARTICLE XXX.

On Hay Harvest, and the Hay best adapted for that purpose.

ADDRESSED TO THE
KILBARCHAN FARMER SOCIETY.

NEIGHBOURS,

I Wrote you about a year ago, upon the difficulties, and management of a Bad Harvest. I did not, at that time, think of the Hay Harvest. As you, however, are entitled to every hint which I can give, for your benefit, I hope you will accept of this, as a supplement to my former letter, and a new mark of my attention to your improvements, through whatever channel it may reach you. I would be fond, of being more generally useful to my country; but I am afraid of going beyond my depth. I know your customs, and am every day forming schemes to improve them: Should I attempt to write more at large, there are many places in Scotland, so far beyond us in culture and management, as might lead them to neglect any custom of yours, or hint of mine.

When I write to you, my Friends, of Hay Harvest, it must occur to you, that we have two seasons, which will pass here by that name. The *first* is, the season in which we cut and make our sown grass hays: the *second* is, that in which we cut and make our meadows or bog-hay, about a month or more after the former.

Vol. II. No. V

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We begin with the sown grafs. And here, as it is not only an object of public curiosity to know the different customs of Scotland, but particularly necessary, in order to understand any provincial writing, I shall take notice of the state of your husbandry in the West, with regard to sown grafs.

Many of you, my Neighbours, sow only ray-grafs upon your grounds; some, with more foresight, add a few pounds of white clover. The first only is intended for your hay crop; the second is designed, after the ray-grafs runs out, to sward your grounds with a better grafs than what the soil perhaps would produce of itself. For in your light grounds, you have great dependence on your milk cows and young cattle. If you are possessed of a deep and rich soil, it is not uncommon for you to sow from six to perhaps ten pounds of red clover. Even from this addition you do not expect much increase to your hay crop, unless the season has been favourable. But where the clover thrives, the after math is very great, sometimes I think superior to your first cutting. This however is commonly pastured in the later end of the year, when the natural grafs fails: Or, which is much safer for black cattle, and equally beneficial for horses, it is cut and carried green into the byre or stable. If it cannot be all overtaken in this way, a certain portion of the field is made into hay for immediate consumpt, after the green feed is gone: for it can scarce be dried for keeping, unless it is mixed with the straw of oats or barley; a custom which you have not yet adopted.

This, I imagine, may give a sufficient general notion of the practice in the West, with regard to sown grafs. In other places the management may be different. It is common in England, and the East of Scotland, to sow large fields of red clover alone; perhaps chiefly as a preparative for future tillage. Indeed, some of our grafs fields in this neighbourhood have been broke up with great success, in the very luxuriance of the after-math. But this practice has not as yet got into common use.

I have been indeed told long ago, that the ray-grass had lost its reputation in England ; and therefore, if their farmers design to lay down a field for continuing in grass, they use the natural grass-seeds rather than any other. Indeed, upon their plan of husbandry, this may be requisite, to make a thick and lasting cover to the ground. Their constant cropping of their grounds for many years together, with the intervals of summer fallowing and hoeing, may destroy so effectually the natural grass, as would leave very little cover on the ground, when the ray-grass and clover wears out. It is not so with us. Though upon the introduction of clover and ray-grass, some of our gentry spared no cost, not even a summer fallow, to produce clean and large crops of hay ; yet they have not been imitated, nor have they themselves persevered ; though nothing pays a fallow better than grass, or such small seeds. Our grounds are therefore in general laid down foul enough ; which allows the natural grass to take place, sooner sometimes than we wish for it. I am therefore inclined to continue the use of ray-grass, with a mixture of red and white clover. These do very well with us for a crop or two of hay ; and I see no great need for our being at great pains, in collecting the natural grass-seeds, even for our grounds that are to lie, till our better culture shall make it more needful than it is at present.

When a particular practice depends upon a variety of circumstances, in any plan of husbandry, it is improper to make partial encroachments on it, unless we mean to reform the whole.

I have however another, and a more important end in view, when I wish to continue the ray-grass in use, preferable to red clover, or natural grass : It is easier to make than any other hay whatever. In all our English writers, I observe, they find greater difficulty in managing their hay, than any other crop ; at least they express more anxiety for good weather at that season, than any other. This has oft amazed me, who, living
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in an unfavourable climate, never found difficulty, nor felt anxiety on that account. I have been therefore ready to impute their difficulties, either to bad management, or to a too great attachment to red-clover alone, or to natural grass enriched and softened with dung; both which are more difficult to manage than if it were ray grass, or ray-grass with a small mixture of the clovers. A course of twenty years experience, without the least loss or hazard, either of hay or seed, entitles me to say so much; and to recommend both the ray-grass and the following method of managing it.

But before I enter upon the management itself, in regard to the influence that hearsay and prejudice have upon many in your rank of life, I cannot conclude this recommendation of ray-grass, without taking notice of one objection against it; which is, that it wears out the soil as much as any corn crop does. But, having heard the objection near twenty years ago, and with this addition to give it weight, viz. that it had been long made against it in England itself; I then instantly resolved to be at a point with it: Having therefore the year before cut off an acre of ground from a neighbouring field, for the purpose of trifling experiments, I now put it to this use. I sowed both the field and it with ray-grass and clover, upon a similar dressing: I cut the field but once, and pastured it for three years more: I cut the acre all the four years successively. And when on the fifth year, I broke up both for tillage, I found the oats equally luxuriant: I even found my fourth crop of hay, upon the single acre, not much diminished from the former crops, as the natural grass supplied the gradual decrease of the ray grass and clover. And my only inconvenience was, that the superior proportion of natural grass incommoded me a little in that management, which I mean to recommend. From this trial I was sufficiently certified, that, in my light soil at least, there was nothing worth my care in the foregoing objection. One indeed has reason to suspect, that fashion, the most capricious of all tyrants, may get into our

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husbandry, as well as our dress. The honest farmer, therefore, has equal reason perhaps to guard himself against the fondness for novelty and change; as against the bigotted attachment to old custom.

As I observed formerly, that there are seasons for hay harvest; so, to my less attentive neighbours, I here observe, that there are two seasons for cutting ray-grass itself: which, if they can help it, they should never suffer to be confounded. There is first its virgin state. For if they intend the field or any part of it for their own consumpt; or even, if they do not like the appearance of mixture in the feed, and incline not to save it, the hay should be cut, when the field is generally in blossom. I think it a loss to myself to delay the mowing beyond that period. For if the seed is once impregnated with the meal of the flower, it comes on so fast in that season, that the hay itself is apt to spend too much of its virtue in ripening and filling the seed: And the seed, which, had it remained on the straw, was alone able to have supplied that waste in the hay, is apt to be shaken off in the handling and using of it. A prudent farmer, says Mr TULL, should never suffer any of this early cutting to go to market; both because it should save him a great deal of oats, and, at the same time, it will not in the market bring him a price proportioned to its intrinsic value, or to the value of the seed which he sacrificed to obtain it. I have constantly kept this virgin hay for my own use, and have learned, from experience, to esteem it beyond my thrashed hay.

The second period of cutting ray-grass is, when its seed is just so ripe as not to shake off the straw, till it is thrashed in the field. For here the intention is to save the seed as well as the hay. The rule which I first observed, for judging its ripeness, was, biting the seed through with my teeth, in different parts of the field. But I was taught an easier and equally certain method of ascertaining the ripeness, by an East Country Farmer that long resided in the West: and to this ingenious

nious man, I owe much of the little knowledge I have in works of husbandry. When the field was dry, he took off his hat, and struck the edge of its crown against the growing ray-grass; and if five or six seeds fell into the bottom of his hat, it was then, he said, ready for any three or four days continued work. This rule I have found from experience to be sure enough. For if the weather is good during that time, the seed will be generally, about a fourth or fifth part heavier, than what we get from England; which is the medium of ripeness that I think safest upon the whole. If it is too thin and light, it will not vegetate so uniformly: If it is too full and hard, it cannot without loss be handled at all. And whatever others may think, my opinion is, that some little nicety in attending to the above particulars, is of some consequence; for if I have not been oft mistaken, many pounds have been lost on several fields, within my observation, by such as despised the attention requisite.

As the management for saving ray-grass hay is the same, whether it be cut in its virgin state, or when the seed is ripened; we shall follow the steps usual in the last case, which will include the thrashing operation.

The first work is mowing and lap-cocking, both of which are performed in one day; and, with respect to any part of the field, nearly in one minute.

The second work is thrashing and tramp-rucking, which are also performed on the same day. And I will venture to say, that as the hay is in a state of absolute safety, from the time it is put in lap cock, and for several weeks afterwards; so I may also affirm it is in equal safety, for months, from the time it is put in tramp rucks. And, if there is not a minute lost between the cutting and cocking, and there needs not an hour be lost between the thrashing and rucking, I cannot see how there can be any risk of the hay; unless a bad day is chosen for these several operations, and the work itself continued under the very rain.

For

For the lap-cock operation, it is necessary to provide every pair of scythes with three followers, boys or girls from fourteen to eighteen or more years. Two of them are employed in cocking, and one of them is employed in raking between the cocks.

The manner of conducting the whole is as follows : After the mowers have got about six yards of swath, so as there can be no danger of hurt from the ends of their scythes, the cockers begin ; first by gathering up in their arms as much of the swath as will make a cock, following sideways after the mowers as they gather it ; then they shake it into a heap, as neatly as they can, upon the end of the swath where they left off gathering. This they do chiefly with one hand, or if both are employed, it is done alternately, all along endeavouring to make the straws fall across each other, that they may bind the mass together every way. This heap the cocker presses down quickly, but gently with one hand, and immediately grasps the whole to her bosom, turning both sides away from her at the same instant. This position being secured with one hand, the other is employed in folding over the upper edge of the heap in the same manner : and this position being also secured as above, the loose hand is employed in folding back a part of what hangs downward, which reduces that lower side to the narrowness of a tail ; and this at last is also folded under the cock, as it is laid upon the ground ; for the cocker steps backward, drawing that narrow tail along the stubble, and even binding it by a gentle pressure on the ground, as the cock is laid down : And this finishes the operation of lap-cocking.

The lap-cock has five folds, and when well made, it has the appearance of a round ball, flattened a little beneath. It may be about a foot high, and eighteen inches broad. If it assumes an oval figure, there is no great matter, as the end of it will always stand to the wind. But this shape is acquired by giving too little pressure in laying it down, which does not bind in the
tail

tail enough; and therefore it may be easily corrected at pleasure. The crossing of the grafs straws on the surface, gives it the appearance of net-work, or rather of an old fashioned warp-clew, before the babbins were invented for warping; only with a third part cut away, for a flat side to ly upon.

If in shaking the hay at first upon the heap, both hands are employed together, without sufficient care to let the whole fall upon the center of the heap, then it makes two little hillocks a top, which, after they are formed into a cock, are apt, for want of sufficient cohesion, to separate, and let the rain into the heart of the cock. If the straws of grafs fall not in a cross direction, but rather in parallel lines, the same effect follows; it is apt to open, or to let down its out sides (especially if not folded up lightly) in the form of a tea-cup, turned down upon a tea saucer. These appearances are ugly, and their effects bad; for the rain gets either into the cock, or into what I called the tea saucer, which by lying flat upon the ground is soon blackened; or if the drought continues, it is parched and discoloured, by having too much surface exposed to the sun. Last of all, from some of the foregoing causes, sometimes the ends of the upper straws start up, and lye flat upon the head of the cock, like an old fashioned straw-hat; and the first puff of wind blows them off. If this appearance discovers itself immediately, the cocker whips it off, and carries it on to the next cock; but if this is not done, it spoils the look of the field, and some small part of the hay. Let the cocker therefore shake the hay well, and with one hand at a time, moving softly half round the heap, and backwards to her place, during the shaking; in order to make the straws cross each other in all directions, as they fall: Then let her grasp and fold it up lightly, and press it to its roundness, as it is laid upon the ground: And thus the work is done in taste, and with good effect. The operation, like every other manoeuvre, may seem tedious in the description; but, when learned, the execution is instantaneous.

After

After this account of the lap-cocking, nothing more needs to be said, but that the work be carried on after the mowers to the end of the swaths; and if any thing is left there, let it be raked to the side of the growing hay, where it will be taken up next time. The raker, as he follows the cockers, sometimes gathers a little heap before him; but this, when it begins to be bulky, is taken off his hand by the nearest cocker, and so carried on to the next cock. So that if a clean place is chosen to set down the cocks upon, and the raker is dextrous in cleaning the places, the field is left perfectly neat, without any thing to hurt the eye. It is even pleasant to see, with what regularity and activity the work goes on, every one pushing another. The mowers are loth to be overtaken, and therefore earnestly push forward: Their followers, loth to be left behind, hurry after them; sometimes also running backwards the whole length of the cutting, that they may enjoy a minute's rest, while the scythes are a sharpening. Nor does the labour thus divided, seem to be in the least disproportioned, unless the grafs be very thin. Then indeed the mowers and cockers have it in their power, to run away with the work, and leave the raker; but, for this reason, the strongest and nimblest of the followers, is commonly put to the rake; or they take it by turns, to lighten the heavy burden.

When ray-grafs hay is put up in this fashion, it will endure a long continued rain, without being hurt. I have had it under fourteen days and nights rain, without the least loss. If the farmer will take up a well made cock, half an hour after a heavy shower, he will be convinced, when he finds how light and dry it is. The moment therefore that his field is cut, he is at ease for a time, being almost assured of finding a good day for thrashing it, before it can run any hazard.

In the mean time, if the weather be favourable, and his field open to its influence, the farmer may take up his virgin hay, in five or six days from the cutting, and put it in tramp-rucks, of a hundred or a hundred and twenty stone.

And no other preparation is necessary for this, but to turn up the lap-cock bottoms before breakfast, if those parts should have got a dampness from the ground, with which they were in contact: and even this precaution is chiefly necessary, after the ground has been wet some time, or the rucking delayed beyond its usual term.

That field, or part of the field, which was reserved for seed, may, in favourable weather, be taken up out of the lap-cocks, in four or five days after cutting; provided the thrashing be performed in the field. Nor is it even necessary, when the thrashing goes on immediately, to turn up the bottoms in the morning: For if the day itself is good, the airing which they receive in carrying, thrashing, shaking out the seed, and in the whole work of rucking, is fully sufficient to take off any coldness contracted by lying on the ground. But, if late rains have made it necessary to turn the cocks, the farmer must himself judge of this; and the operation is by no means tedious.

You have now, my good Friends, been witnesses to the lap-cocking near twenty years in this neighbourhood; yet you have not generally followed the example. Some of you continue to spread out your hay to the sun; others of you sheaf and stook what you design for seed, as you do your corns; and though we have conversed sometimes upon this subject; yet hitherto we have none of us convinced another. I would therefore beg your attention to the few following remarks upon these customs.

The custom of spreading out hay to the weather in the day time, and gathering it up at night, till it is well; though too generally practised in England itself, I must disapprove of, in every view which I can take of it, save one; and that is, when the intention is to leave the seed upon the ground, in order to thicken the crop next year. The proverb indeed says, "Make hay while the sun shines." But if the maxim is taken literally, it is several ways pernicious. The apothecary,

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who means to preserve the good qualities of his medical herbs, dries them in the shade, and would esteem them lost if exposed to the sun but for a day. Is it then possible to expose hay to a hot sun, for two or three days, without evaporating most of its good qualities? It is scarcely to be thought. If on the other hand, the weather should happen to break while the hay is thus spread out, pray what becomes of the hay-maker, not to speak of the hay? I need not describe the miserable wretch, or paint his situation: He himself must feel it. If he intends to thrash the hay, made in that fashion for seed; why, it is gone. Let him but weigh, and examine the rakings of a field, and then he will know, what effects the dragging of his hay through a close stubble must have upon it. I never could rate the loss of seed in this way, at less than thirty shillings an acre: and if the farmer can count, that is at least thirty pounds sterling, upon a twenty acre field. I am ashamed to see this money thrown away, by such as can both think and figure. Were this sum stolen from them, would they not regret the loss, and resent the injury? The only apology that I can make for them is but a poor one; having never perhaps received money for grass-seeds, they are not in use to value that article, as they do other grain. I have even known the virgin hay itself suffer in the same manner. For though it is not designed for thrashing, yet is it often cut so late, as to have much of its seed ripened, and shaken out by the above management. Had it been preserved upon the straw, its own good quality might have compensated that waste, which the hay made of itself, in producing and filling it. The last objection which I have against this method of making ray-grass hay, is its attendance and expence. Indeed nothing can be more fatal to the farmer, than his being at double expence in retaining a pernicious, or even a dangerous custom; when he might have adopted a cheaper, safer, and better. If farmers however will suffer their ray-grass seed to fall upon the field, whether by negligence or design, I
could

could wish they were prepared to adopt the improvement, celebrated by Mr YOUNG, upon the Marquis of Rockingham's farm; which is, to give the field a top dressing from the mar-hill, above the shaken seed. This might assist it to vegetate, and both thicken the grass, and improve the ground for a succeeding crop. But until we are more in use of preparing such dressings for our grounds, it will be our advantage to take care of our seed for the market.

The other method of winning ray-grass hay, is bundling it up in sheaves, and stooking it, as we do corn. This method is only used when we design it for feed. I must indeed own, that the stooking of ray-grass will preserve it a long time from the injuries of the weather. But as it cannot so soon prepare the hay as the lap-cock, it must run a greater risk of meeting with such injuries, during the long time it is out. As was observed to you in my last, the oats, which are small in their straw, and full of grass, are the most difficult to win: So I now observe, that the matter is not much mended, when the whole sheaf is grass, even though it be ray-grass. Accordingly, I have seen ray-grass stooks, standing on some fields to the west of us, long after the corns about them were reaped; and I have seen them so much blackened in their colour, that I could scarce tell what was on the field, till I drew very near, and knew the ground by the stubble. Nor do I mention this disagreeable appearance, as a singularity; It has many times occurred to me, and as oft pained me. I am at a loss to account for the long continuance of this practice, in a neighbourhood that has as long presented objects of a better oeconomy. I have indeed been told by some, that they can sell their hay as dear as I can mine; and when I urge this point, they say, perhaps truly, that there are some inn-keepers not so fond of the hay which horses are over fond of. I hope there are few such, if any at all; for I should be sorry, if the sloth of one set of men received protection from the infidelity of another. Sure it cannot be the case in
great

great towns, where gentlemen, who love their horses, will chuse the best hay for them, as well as the best accommodation for themselves. Others indeed candidly own, that being accustomed to the practice of binding and stooking, in which, with proper attention, they have hitherto been successful; they cannot give themselves the trouble of introducing the lap-cock method among their servants; especially, as they apprehend it to be no cheaper than their own. To such I would only observe, that if two mowers at 1 s. 6 d. each, and three cockers at 6 d. each, will finish two acres a day, at 4 s. 6 d. I can scarce conceive a cheaper method of working as much ground; especially if both hay and seed are secured by it. I have indeed no personal experience of the method of binding, and stooking after the scythe: But, from what I have generally seen of this practice in other hands, it appears to me, that greater hazard is run, and more labour bestowed upon it, than in the lap-cock way. I do indeed remember, to have enquired into the expence of reaping corns by the scythe in England, above ten years ago; with intention to have introduced the practice here, if I found it advantageous: and by all the information I could receive from our travelling chapmen, who I found had been struck with the novelty, and had even enquired into the expence, I never could make it less than four shillings the Scotch acre, or the five roods English; which is near double the charge of lap-cocking. At present, when I suppose two scythes, and two Scots acres wrought, I can yet bring it no lower, considering the number of followers, and the nature and expence of their work. Such of my neighbours as have given occasion for this minuteness, can surely tell, upon due reflection, what is the real expence of binding and stooking ray-grass: And if they find it greater than what I have stated the lap-cocking, they will both be so candid as to own it; and so prudent as to desert a losing plan, and even so honest as to give one example more of a better oeconomy.

The

The only objections worth notice, that have occurred to me, against the lap-cocking, are two.

The *First* is, That it exposes a great deal of surface to the sun; which in clear weather some think may discolour it. This however cannot be compared to the scorching which it gets, by being spread out, and turned up on all its sides to his beams. For here the whole effort seems to be, to burn up every straw. Nor do I think it comparable to the long time, in which it may suffer the sun's influence, while in the stook. For, if it is considered, that, in fine weather, hay for seed seldom lies in the lap-cock above four or five days, and that the sun beams do not penetrate beyond the outside, while all within remains perfectly green; one might venture to say, without experience, that the hay cannot be hurt. This indeed is the truth, and the first trial will confirm it. No method preserves the colour better than the lap-cock; for when it is mixed by the thrashing and shaking, the nicest eye cannot discern upon it the least mark of sun burning.

The *second* objection is, that the lap-cock is not fit for all sorts of hay. Well, and what if it should not? ought it not therefore to be used where it will answer? In this view surely it was, that I recommended ray-grass with a proper mixture of clover, as what we might infallibly depend on, with the lap-cock management. But not to suffer you to cheat yourselves out of a good practice, from imagined difficulties; allow me to add, that if you hesitate on account of too great a proportion of red clover, or of natural grass; you have no more to do, but to suffer it to lie in the swath, where it is safe, for a day or two: and with this short interruption, the lap-cocking may go on as before. This I have often done with good success. Last of all, I can assure the public, that I have seen the softest grass perfectly made by lap-cocks, even in thickets and close places; and that only by making them of a smaller size, and suffering them to lye a sufficient time. I have even employed them for winning short pease, with excellent effect. And

have

have therefore frequently wished, to have carried the use of them into the common meadows. But my own meadows being made up, in some places of rushes and spritts, which were too stubborn for that work; and in other places of such short soft grafs, as would not be made to stick together in a ball, I was obliged to give up the scheme for myself. I still however, would recommend the trial, to such of my neighbours as can better practise it.

It is now time we were thrashing out our ray-grafs seed, if you are not already wearied with what is past. But having been at full pains to fix the capital point, the remainder may be shortened.

After the ray-grafs cocks, intended for thrashing, have been exposed four or five days in good weather; or if bad weather has fallen, and delayed the work, then, on the first good and promising day that casts up, I prepare for thrashing in the field.

Those who have convenience within doors, and perhaps none for thrashing without, carry their hay to the barn; and there thrash it at leisure. But if I can find a good day, at any time within three weeks of the lap-cocking, I prefer the field, for the following reasons.

1st, A clear good day greatly assists the thrashing work, and contributes also to mend every part of the hay that needs drying. 2dly, I chuse to keep all my barn room for spreading out my seed, nothing being so much in danger from heating as new thrashed hay seed. 3dly, It is an essential part of my plan, in the management of all sorts of hay, to keep it sometime in tramp-rucks without, before I carry to the stack-yard. There I give it the sweat, that is both so necessary to its future safety, and also contributes to give it that sweetness and tenderness which makes all cattle so fond of it, and to thrive so well upon it.

These

These particulars may receive some further illustration, in the course of what follows.

For the thrashing work we provide (or borrow) four or five ten feet planks, upon which it is performed : under these is laid the largest winnow cloth that can be had ; and if the wind favours, we lay them commonly a-cross a furrow, in order to contain a greater quantity of seed before removing them. Upon the windward end is laid another winnow cloth, or two coarse bed sheets, upon which the lap-cocks are thrown, as they are brought in to supply the thrashing floor. On the leeward end is laid a third cloth, upon which the seed is shaken out of the thrashed hay, after the flails have driven it down the wind, to that end of the thrashing floor. For about four acres of hay ground we provide two thrashers, with two or three flails lying by them, in case of their breaking those in use. It would not be convenient for eight or ten people to wait the mending of a flail. We have one woman on the wind end, to supply the floor with unthrashed cocks, another strong one on the lee end, to shake the hay, and throw it well back behind her, till the tramp-ruckers can begin. We have also four more boys and girls, that are employed to carry in the cocks, and to rake the field. Each of these are furnished with a horse sheet, a coarse table cloth, or any thing proper to carry the hay, and prevent the seed from losing by the way. When it is not too ripe, there is not so much need of these clothes. While the carriage is from the most distant parts of that portion of the field allotted for the floor (for the field is divided into three portions) all the four are employed in supplying the floor. As the distance begins to diminish, one of them takes a rake, to clean what is cleared of the cocks : and thereafter another goes to the raking, as the distance is still lessening. And the matter may be so managed, by an attentive master, that the whole of the first portion may be finished at once, by the time of breakfasting. Then all hands are hurried, in filling up the seed into sacks, which is carried home by the house servants,

as they go to their breakfast; and spread upon the barn floor without delay.

After breakfast, if there was not leisure before it, the cloths and planks are removed to the most convenient place, in the second portion of the field. There the same operations are carried on, till it also is cleared. And the same are likewise repeated after dinner, till all is thrashed that was allotted for the day.

If the farmer has not seen it necessary at breakfast-time, to provide hands for the tramp-rucking; before dinner he must be a judge, how far his own people shall be able to accomplish it, against the evening. He may therefore in that interval, if he thinks fit, call in the assistance of a neighbour or two; to begin the rucking for his evening security. At the same time, it is surprising what work will be done in an hour at night, by a number of hands properly encouraged, and wisely distributed, when you depend upon them for it. Every farmer knows how small a trifle will gratify, and nothing more needs to be said upon that head. My method of distributing the hands is this: While the men fill up and carry home the feed, the women and boys are sent back to the first made heap; where they begin in two parties to lay the foundation of two tramp-rucks, in the lee side, for the convenience of forking up the hay. When these rucks grow to a height, and begin to be difficult for the young labourers, the men come and take them off their hands, in order to compleat them; while the young ones go on to begin another pair. Thus a good number of hands, that otherwise might confuse and interrupt each other, do wonderfully well when properly distributed, and animated.

In this manner, a four acre field employs the first day, four mowers, and six cockers; at the expence of	L. 0:9:0
And it employs the second day two thrashers at one shilling, six young people at sixpence each; amounting to about	0:5:0
If we should allow for extra-work in rucking, or increase of wages, about	0:2:0

The amount for the whole, is only L. : 16 : 0

I should think it could scarce cost more, unless the crop is very weighty, when an advanced price will not be grudged. I even think the security, which the farmer may enjoy, in this course of management, worth a great deal more to him than the money itself.

The seed and chaff carried into the barn, is spread upon the floor the first night. Next morning the straw is riddled out of it; and it is laid out again; the farmer throwing it into ridges, as the maltster does his beer from the steep. At evening, he runs the barn shovel through every ridge, to change the places of both ridges and furrows: and this he continues to do alternately every twelve or twenty four hours, as he sees occasion; till he chuses to chaff and clean his seed. If he values his chaff, he needs not be in a hurry to separate it from the seed, as both alike require to be fully dried for keeping. After he puts them through his fanners, if he is very nice with his seed, he may let the seed down in a soft wind, between his doors; where, by the assistance of both his sight and feeling, he can separate the fat grafs, and thin ray-grafs, to what extent he pleases. He must employ his small sieves, to take out the goose and point grafs: the seed of which may be either thrown to the chaff; or made to serve for a feed of oats, when the labour of the horses is but light.

Many of you, my Friends, are fond of saving (as you call it) the field thrashing and tramp-rucking. You therefore carry your seed hay to the barn, to be thrashed there at leisure. I have
already

already given my opinion, and reasons against this conduct : and only add now, that such of you, as think housing and thrashing within a saving to you, would only consider, that what you carry to the barn comes again, and begins to sweat ; in which state it is very difficult to thrash it well. If it is reserved for a leisure, that is a wet time, it can only increase the difficulty, and inflame the charge. If the continued goodness of the weather makes you forget your barn work ; or if you put it off intentionally, till the sweat be over ; you have a chance of being encumbered with it at an improper time. And to crown all, perhaps you run the hazard, with such a bulk of hay together, and in such close confinement, of over-heating it to a degree of rottenness. Look then before you, my Friends, and be not fond of saving one day that will cost you six, and perhaps the value of forty. There is no oeconomy in that conduct.

To all the prudent my advice is, to thrash their ray-grass hay in the field, if they can : and that (tho' there was no other reason for it) for the sake of its standing some time abroad in tramp-rucks. There, as I observed, it should have its sweat, if one would afterwards be secure with it. When I recollect, what I have both read and heard from England, about the pains of their farmers to have their hay properly sweated, (for nothing else will sell in their markets,) and when I consider their difficulty in governing that process in the stack, I cannot but recommend the field tramp-ruck, beyond all other securities. For in a ruck of about 100, or 120 stone, I am certain of heating it properly ; and if I find it to be overdoing itself, I can check it where it stands, without anxiety, or trouble ; and that only by raising any part of it with a common lever, and casting what air I please into it. Indeed, in nine of ten instances, I scarce have found more requisite, to bring the hay of rucks into proper temper, than barely to do, what every farmer, who keeps his hay, must at last do ; and that is only, to carry it from the rucks in the field, to his barn-yard, and there to stack it up for good : for one clear day, with the repeated forkings,

and the spreading of it on the stack, is sufficient to cool it. If more is ever needful, it must have arisen from a blameable precipitancy in rucking or stacking. Were hay in any danger in the lap-cock, there would be some excuse for hastening the rucking: Were hay in any danger in the tramp-ruck, there would be some excuse for hurrying it into the stack. But the security in both these states is such, as should lead no man into any blameable rashness, but such as cannot enjoy their own quiet.

Small rucks, intended for keeping hay any time abroad, I abhor, and must condemn. Nothing keeps hay worse. They either sink down into a flatness, or are tossed over with the wind; so that I have seen them to the westward, lying more like a muck heap, than a hay quail; and that full two months after the hay had been made. They are often the result of making hay in the sun-shine. Huddled together in small quails, at Even rain comes on, and wets them thoroughly; and there they lye, waiting till heaven work a miracle for their recovery.

We should now take a short turn with the farmer to his meadow grounds. After what has been said upon the tramp-ruck, I need not follow him into his barn-yard. He has managed his rucks ill, if they do not supersede all future care, even of his stack itself, except to put thatch and ropes upon it. If any thing however was needed here, enough has been said in our former letter, to direct the stack yard management.

Of the Meadows.

One rule, which I invariably observe upon my spritty bog, is, to cut it two or three weeks, before my neighbours cut theirs. Instead of waiting from week to week, till it thickens more at bottom, or lengthens out an inch or two more at top, I trust such additions to the after-math. I am particularly fond of having all hard and coarse hay cut in its greatest and tenderest state. Indeed my whole effort afterwards is, to preserve that

that greenness and tenderness, by retaining almost all its juices. For this purpose, I suffer it to lye in the swath to dry, two or three days: and I find by experience, that it will, in that state, keep better under the wettest weather, than in any small quoils. Then, pulling out as many of the strongest sprits and rushes, as are necessary for ropes, and even for thatching itself, I turn over the swath, as whole and unbroken as I can: where it again lies sometime, till I can put it in good sizeable hand quoils. I never spread out, or turn it more; unless a storm has discomposed, and wet my quoils. I manage it therefore chiefly by turn quailing; in which operation, two or three little quoils are put together, into one of a larger size. And by repeating the same operation, it gets at last into tramp-rucks: and there it stands to sweat, for two or three weeks, till it can be safely carried and stacked.

Hay never, in my opinion, runs much risk, but in small quoils. And this, when it happens, is corrected, only by throwing down a little of their tops, or, if the ground is wet, by pulling out a little from the edge of their bottoms: and this may be spread out, an hour or two before the turn-quailing. But even this small risk does not please me. To avoid it therefore, I would wish to introduce the lap-cock among those of my neighbours, whose meadow hay will admit of it. It could be done, as was hinted before, by delaying the cocking for a day or two after cutting the hay, and by making the cocks smaller than was directed for ray-grass. But if farmers are unwilling to go to school in their old age, or if they are ever hurried with changeable weather, so that they have not time to put their hay together, either in good hand quoils or lap-cocks, they might try another fresh custom, of greater expedition than the lap-cock, and of better security than the hand quail. It has this advantage to recommend it, beyond any thing quite new and strange, as the servants may have practised it among other useful frolicks. For it is no other than rolling up the swath, as children do a snow ball: which may
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be done, to any bulk that the present state of the hay will admit of, from two to three feet diameter. I have often tried it with ray-grass by way of experiment: and have found it to keep the hay perfectly well that was rolled up dry, so long as I had occasion to have it in that form. No rain indeed penetrates it to hurt it; so that unless it lies till the natural sap over-heats it, I imagine, it cannot otherwise be hurt; nor would I much suspect the heating itself. But having only made a few balls by way of trial, which generally went up into the tramp-rucks, with the rest of the lap-cocks around them; my proof of them was not, as I remember, above eight or ten days standing; from which I myself can pronounce nothing absolutely decisive.

I am,

My good Friends,

Yours to serve you,

Renfrew-shire, }
March 7th, 1774. }

ARTICLE

ARTICLE XXXI.

THE FARMER'S KALENDAR.

A P R I L.

B A R L E Y.

THE barley crops not sown in March, must be in the ground by the middle of this month without fail, or a poor crop may be expected. The land I suppose to lay as thrown up in the autumn before ; so that whenever sown, it is on the spring earth. This supposition is absolutely necessary ; because, if there had been previous plowings in March, or the end of February, the seed should then have been sown ; excepting, however, turnip land, which broke up at first too rough to sow, which will sometimes happen. The farmers, in some parts of the kingdom, will put off their sowing till the last week in this month, and the first or second of May, for the sake of gaining time for giving three spring earths ; but they lose more by far from late sowing, than they gain by making their land fine. If clover is, as it always ought to be, a principal object, and they had not the land fine enough before, delays must be made ; but still they can scarcely be owing to any thing but bad husbandry : for a farmer should always have such events in view, and give the tillage before winter, on lands not cropped with plants that stand till the spring. The utmost exertion of good husbandry should be made to reconcile jarring circumstances when they cannot be totally prevented. These observations on barley are equally applicable to white oats.

White Peas.

This is the proper season for sowing the white boiling pea. The land should be light, either sandy, gravelly, or a light loam

loam, in good tilth, and the seed harrowed in, about three bushels to an acre. It is a very profitable crop on such soils, killing the weeds intirely, if the pease are luxuriant, and much ameliorating the land; but on clays and heavy wet loams, the culture is by no means adviseable, unless they are well drained, in good heart, and excellently pulverised.

Buck wheat.

The lands designed for buck-wheat, in May, should be well tilled this month, plowed twice, and harrowed three or four times. It is not necessary for that grain, but for the grasses you should always sow with it, and for that most important object of making all the seed weeds grow, in order to turn them down by the following plowing. This April preparation marks the land for buck-wheat: I shall therefore, take this opportunity to advise the farmers in general to try this crop more. Nineteen parishes out of twenty through the kingdom know it only by name. It has numerous excellencies, perhaps as many to good farmers, as any other grain or pulse in use. It is of an enriching nature, having the quality of preparing for wheat, or any other crop: this is a certain fact, and cannot be disputed, one bushel sows an acre of land well, which is but a fourth of the expence of seed barley. You should not sow it, till about the middle of May: this is very important; for it gives you that valuable time in the spring, enough to kill all the seed weeds in the ground, and brings you under no disagreeable necessity, from bad weather in March and April, to sow so late, as to hazard the crop; frequently the case with barley and oats. It is as valuable as barley; where known, sells at the same price, and, for fattening hogs and poultry, much exceeds it. It is, further, the best of all crops for sowing grass-seeds with; giving them the same shelter as barley or oats, but not robbing them at all.

Sainfoin.

Lucerne.

This plant is one of the most famous that is cultivated in England: it has, particularly of late years, been more the object of conversation than most others, and opinions about it have varied as much. I shall not enter into a deduction of a general nature; but only point out the best methods of treating it, in each of the three grand divisions, which modern writers have thrown the culture into, viz. broad-cast, drilled, and transplanted.

If you sow broad-cast, it should be with buck-wheat, upon land very rich and good, but not wet, and as clean from weeds as the most perfect culture can have made it. The proper quantity of seed is twenty pounds to an acre. It should be sown on the flat, and covered by three harrowings. There cannot be a doubt, but lucerne will answer to great profit in this way, if the land is extremely rich, and of a deep staple; but on lands, poor gravels, lime-stones, or chalk soils, I question whether any great success will attend it.

For drilling this month, which is the prime season, the land I suppose to have been thrown on to the ridge in October, and well water-furrowed, and to have been plowed and harrowed well in March, and the first week of this month. The last of these plowings should have thrown it on to five-foot ridges, after which they should be harrowed with drill harrows. About the middle, or latter end of the month, those ridges should be manured, at the rate of twenty loads an acre of some very rich compost, that is fine, and will not impede either the harrows or the drill. This should be turned in by another plowing, and, at the same time, arched up; then harrowed again, and drilled with three rows, one foot asunder. About five pounds of seed will be sufficient. There is no drill culture of lucerne that exceeds this. The trans-plantation will be treated of under another month.

Drilled lucerne is an extreme valuable crop on rich or well-

manured lands, and with good management. A spirited farmer should therefore determine to cultivate a good quantity of it, that he may at least have a sufficiency for all those purposes, to which it is particularly adapted: these are, feeding horses with it green in the stable, mown every day; keeping milk cows and young cattle, and work oxen; also for feeding swine: but, for feeding horses, its use is so very great, that no farmer should be without a proper quantity for keeping all his teams on. One thorough good acre of lucerne will keep four or five horses, from the first of May to the end of October: a degree of profit, which no other grass will equal. I cannot therefore avoid particularly recommending to all husbandmen drilling a few acres of so excellent a grass, that will be sure to pay him so amply for his trouble; nor should he neglect good manuring, or constant and dilligent attention to keeping his crop perfectly clean from weeds.

Sainfoine.

There are several parts of this kingdom, in which the farmers could not possibly pay half their present rents without the use of this grass. On dry limestone and chalky soils, or on any very dry sound land, no matter how poor, it will thrive to extraordinary profit. April is the proper month to sow it in: the land should be perfectly clean, and free from weeds, and the seeds of weeds; and this is the only circumstance required. It matters not how poor it is: sow it with barley or buck-wheat; the land in as fine tilth as possible, and the seed covered only by one harrowing, if the harrows are heavy, or by two if they are light, and let it be when the land is perfectly dry. Upon the soils proper for this grass, no man can sow too much of it: for no other use of the land will pay near so well. It will on very poor soils, not worth more than from one shilling to two shillings and sixpence per acre, yield a ton and half of hay, or a ton at the least, at one mowing per acre, and afford a considerable after-grass besides. Now, the use of

of hay is so universal, that such products can never want a market; nor such land, thus improved, fail of becoming a vast source of profit to whoever has spirit enough to pursue such a beneficial conduct. The products and profit of such land in tillage, or in a sheep walk, are quite contemptible to them when sown with sainfoine. The proper quantity of seed is from four to five bushels per acre: it flourishes so well broad cast, that there is no inducement to attempt it in the drill method.

Sheep.

This is the month that tries the farmer more than any other in the year. In the whole range of husbandry, there is no point that puzzles the farmer more, than providing for their flocks through April, and the first week of May. It proves the good husbandman as much as any other article in the most extended farm. The common management is to depend on turnips and hay; and, when the former are done, to turn them into a piece of rye sown on purpose, or into the crops of wheat, to feed them off; and these resources not being proportioned to the want, they let them run over most of the clover and pastures of a farm; by which means the crops of hay, and food for large cattle, are greatly damaged. Bad as such a system of management undoubtedly is, yet it actually forms the husbandry of three fourths of the kingdom, and the bad consequences are felt so strongly, that the number of sheep on all such farms, is governed by the food in April. None of them are stocked properly with sheep throughout the whole year, for want of more food at this season: but there are other farmers, who have felt such inconveniencies so strongly, that they have taken a few steps to remedy them: they keep their turnips as long as possible, so as to make their shoots an object of sheep feed; and they every year sow a piece of clover and ray-grass on land in pretty good heart, to be ready in the spring to take their flocks from turnips, and keep them till the general turning to grasses arrives, which

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is about the tenth or twelfth of May. This conduct, I must observe, is an improvement on the other; for it gets rid of three great evils: depending on rye, which is a most paltry feed, and never pays expences; feeding the wheat, which is pernicious to the crop; and turning too soon into the general pastures. But at the same time that it effects this advantage, it is open to some objections, which require a further improvement. The keeping the turnips long in the spring is very bad husbandry: it damages greatly the barley crop, both in robbing the land, and in preventing its being sown in proper time; nor is the food of great consequence; for you must have many acres of turnip tops to keep any flock of sheep: and as to the roots they grow so sticky and hard after the tops are at all advanced, that their value is much declined: then in respect to ray grass, the clover mixed with it, at this season, is seldom above three inches high; and a vast breadth of ground, to a given stock, must be assigned to keep the sheep from the middle of April till the twelfth of May.

It is surprising the number of acres of that young growth necessary to keep an hundred sheep and lambs: so that these farmers, although they manage to spring feed more sheep than the worst of their brethren, yet effect it at a greater expence, and at last not in any degree comparable to what they might do.

A turnip should never be seen on the ground after March; for the month of April the farmer should have a field of cabbages ready, which, yielding a vast produce on a small breadth of ground, reduces the evil greatly of a late spring sowing, and if he manages as he ought, totally excludes it, by planting cabbages every year on the same lands. The large Scotch cabbage will abide the severest frosts, and will not burst: it will last through April. The turnip cabbage will last till the middle of May; and, though it runs for seed, yet the bulb will not be hard or sticky. The green boor-cole may be fed
off

off several times; it is impenetrable to frost, and will make long shoots in the very depth of winter. If I was to recommend a cabbage culture, I should prefer the Scotch for April, on account of its vastly superior produce; and the two latter sorts for the first fortnight in May. A few acres of land would, in this method, support a very great stock of sheep; as may be judged from an assertion of a very experienced cultivator of cabbages, that one acre of the great Scotch will winter fifty sheep.

Another crop for feeding sheep in spring, which is of particular merit, is burnet: an acre of it, managed properly, will at this season yield three times the food of an acre of clover and ray-grass. It should be five or six inches high in November; and left so through the winter. Burnet has the singular quality of maintaining its green leaves, to their full growth, quite through the severest winter: so that, under deep snows, you find an amazing luxuriance of vegetation. From November to February, the crop will gain two or three inches in growth, and then be ready for sheep. It will be better in March, and if kept, ready in April, not only for sheep, but for horses, cows, or any other stock. This is a product, which no clover, or ray-grass in the world will equal; and it is the peculiar use of burnet, to which it should ever be applied.

Cows.

It is no object to a good farmer to get his cows out of the farm-yard this month, especially if he has a provision of cabbages and straw as he ought: he must be very amply provided with grasses, indeed, to do it to a good purpose, as his flock of sheep must be the first object for his spring feed. Besides, the raising great quantities of manure, in the farm-yard, is so important an object, that he should keep it in sight as long as possible: turning out any cattle before there is a thorough good bite for them, is but trifling, and it is very unprofitable; for a field, so begun, will not last proportionably with

with another of a proper growth. The milk cows should have their bellies full of cabbages throughout this month, with straw before them, and always kept both in the yard and house well littered. The lean stock of dry cows should likewise now have an allowance of cabbages.

Horses.

Keep your horses close to the stable throughout this month: do not think of turning them out yet, and have plenty of litter, that they may continue to raise much dung. This is so busy a time, that you should have a close eye to the work your teams perform: remember one day now is worth two by and bye; follow the directions laid down last month, in making them do ten hours work every day.

Oxen.

The ox teams, at this season being kept to pretty sharp work, should be well fed. Give them good hay, and a daily allowance of cabbages. If they are large beasts, they should have fifty pounds of cabbages each, every day. This is a rule, among many others, that will be found to shew the great consequence of having plenty of cabbages.

Hogs.

The flock of fatting swine should now be all gone, but the sows, pigs, and lean hogs, require good attendance: there is nothing yet for them in the fields: they must be kept therefore close to the farm-yards, where the thrashers (who should be kept at work quite through this month) will partly supply them with food; and your wash cisterns, and winter stores of roots, parsnips, potatoes, &c. will keep all in good heart.

Potatoes.

The latter end of this month, the land planted with potatoes should

should all be hand-hoed over the whole surface, to cut up weeds clean, and loosen the earth. This management is known only in the neighbourhood of London; but it should be extended over the whole kingdom, for the excellency of it is indisputable. The expence of hoeing, where there is a clear space to cut, is trifling to that of a crop, and, consequently, the succeeding cleaning which the potatoes receive after they are up, is performed at a much less expence, on account of this operation, and, at the same time, in a more effectual manner.

Carrots.

If the carrot seed was sown very early, the crop will be ready for the first hand-hoeing. the latter end of this month. The rule is, to give it as soon as the young carrots can be distinguished from the surrounding weeds; and it should never be done in wet weather. The men must use three inch-hoes, with handles about two feet long; and they must move on one knee, in the way gardeners hoe onions, &c. If the crop is pretty full of weeds, they must not attempt it standing with common hoes; for it is very nice work to distinguish the young carrots. This hoeing, if the crop is full of weeds, cannot be done under thirty shillings an acre, where the daily pay is one shilling and two pence a day.

Cabbages.

April is the grand season for planting the crop of autumn-sown cabbages: it is a work extremely easy to perform, and not at all expensive; but it is necessary to manage it in a judicious manner, so that it may be done to the best advantage. Just before planting, the land is to be plowed from the ridges of the last earth, arching them up: this earth should turn in the manure; then the ridges are to be harrowed, and one row of plants set along each: this is for four, or five feet ridges; but, if you plant on three feet ones, instead of arching up, you only

only reverse, and plant one row along the top, in the same manner as on the others.

Women or boys should lead the way with the plants, and drop them, as nearly as they can, where they are to be planted: then the men follow with dibbles, and set them: the work goes off quickly, and is not expensive. Upon an average, it may be done in single rows, four feet asunder, from four shillings to five shillings an acre. Keep the men at it as long as they can see; for, if the weather is very dry, it will be an advantage to the plants, to have dews and coolness of the night succeeding the planting.

Water-furrowing.

This is a work that should be well performed on the new sown lands, as soon as the tillage is finished. Very small savings in the omission of this work, will be attended with certain and great losses.

Turnip Fallow.

The fields intended for turnips should receive one plowing in this month, which should remain a little while, and then have harrowings enough to make all the seeds of weeds grow, that the tillage, in the succeeding month, may destroy them; these plowings should be on the flat.

Hedging.

This month must conclude the business of fences. It is bad husbandry to cut any hedges after April, nor do you give the plathes a good chance afterwards: they will not be so sure of growing. Observe also, now to bring home all the faggot wood, arising from the hedges: it should be left no longer.

Clear Grass-fields.

The beginning of this month you should attend particular-
ly

ly to the clearing your grafs-lands from all rubbish that may affect the young grafs; such as the cores of ant-hills, the sticks and bushes that are left after hedging, and whatever else may happen to be found that will obstruct the scythe. Mole casts should be spread about with a spade; and, being nothing but fine loose moulds, will do good to the grafs: the keeping the meadows and pastures in a neat husband-like manner, requires a good attention of this sort.

Rolling.

After the grafs is cleared, in the manner mentioned in the last article, it should be rolled to level it for the scythe: the roller must be just of weight enough to level worm-casts, and crush small molds; that is, a size larger than a common barley roller. Some gentlemen are extremely fond of using very large and heavy rollers, thinking they are beneficial in proportion to their weight; but this idea has been much disputed of late. Another practice, founded on direct contrary principles, has begun to take place, that of scarifying grafs with a plough, consisting only of coulter or harrow teeth. The advocates for this practice assert, that the burthen of hay (not the beauty of grafs) as a lawn is much encreased by loosening the surface, for the roots to have the power of a fresh vegetation: that the fault of most pastures is the being quite bound and hard; rolling increases this tenacity, and is consequently pernicious. Experiments are mentioned which prove, that grafs-lands are infinitely improved by this operation of scarifying; and, further, that its use is extremely great to precede manuring grafs lands; for that much difficulty is found to get the manure below the surface for the roots to feed on; whereas, if it be scarified well, the ground is opened so much, that whatever you spread on it gets at once to the roots; consequently a small quantity, so applied, goes as far as a much larger, laid on in the old way. It must be confessed, that all

the reasoning appears very just, and perfectly consonant with the ideas we have of good husbandry in most other parts of the management of soils. It however is highly worthy of a fair trial, that the truth on every soil may be known; for it is a vast expence that some persons put themselves to in rollers, amounting so high as fifty pounds a piece.

ARTICLE XXXI.

Of the culture of Plants, whereof the stalks and leaves are the principal parts

[DICKSON'S AGRICULTURE, Vol. II.]

IT is wisely ordered in nature, that the plants which grow without any culture, are proper for maintaining the cattle most useful to us. Hence it became an universal practice, to allow a certain proportion of land in every farm to rest for food in the summer season to the cattle that laboured it, and this was changed from one place of the farm to another, as the situation of the land required, or was most for the conveniency of the farmer.

This, not many years ago, was the state of all the corn countries in Scotland. The grafs upon the farms, as may well be supposed was very bad, for no land was allowed to rest while it was fit for carrying a crop of corn. Even supposing that some small fields were laid off in tolerable order, yet it required a greater number of years to bring a good sward upon these, than the farmer found it convenient to allow.

Matters continued to be carried on in this manner, till the demand for butcher-meat began to encrease. This introduced inclosing; for excepting a deer park, or a few small
closures

inclosures about a great man's house, there are very few in Scotland, that have not been made in the memory of some persons still living. Then likewise, the farmer observed, that it would be a great benefit to him, to raise good grass without waiting the time necessary to produce this, in the ordinary way of allowing land to rest.

The demand for butcher-meat encreased, and from this and other circumstances, encreased likewise the demand for hay. To supply these demands, the sowing of grass-seeds became necessary. The kinds introduced into Scotland, are these following; rye-grass, clover, lucern, and St. foin. The culture of these shall be separately treated of.

Of Ryegrass, or Ray-grass.

Rye-grass is the most common of all the artificial grasses cultivated in Scotland, and notwithstanding what some have said against it, is not the least valuable. Like the common grass that grows naturally in our fields, it is a fibrous rooted plant, and binds the soil on which it grows. This has stirred up against it many enemies who assert, that it is a very great impoverisher of land. This grass has got this bad character, perhaps more from the practice of the farmer, than the nature of the grass; and were any of the other grasses treated in the manner that this kind is often treated, they would perhaps be found as great, if not greater impoverishers of land than it is. Rye-grass is often allowed to perfect its seed; when clover is allowed to do this, it is found very hurtful, probably more so than the rye-grass.

But though rye-grass, in some respects, may be inferior to some of the other grasses cultivated in our fields, yet in justice it must be observed, that it has some advantages that are peculiar to itself, and these advantages too very considerable; it grows upon soils, on which none of the other artificial grasses succeed; and it is useful to destroy weeds, particularly

larly the quickening grafs, by which our lands in Scotland are fo much infested.

Soils that are fhallow or fpongy, or have a great mixture of mofs, cannot be prepared by any kind of culture fo as to carry good crops of clover, but thefe foils may be prepared in fuch a manner, as to make rye-grafs thrive very well.

When rye-grafs is fown, it foon covers the furface with a fward. This prevents all the roots from vegetating, whofe ftems are not ftrong enough to pierce through it, among which are the roots of the quickening grafs; and thus being prevented from vegetating, they foon rot in the ground.

This kind of grafs is often fown, mixed with other grafs feeds; and this is, no doubt, a very proper way when the foil allows; but foils, as has already been obferved, that are fhallow, wet, fpongy, or have a mixture of mofs, are unfit for clover of every kind; and therefore on thefe it becomes neceffary to fow the ray-grafs without any mixture.

The ordinary way of fowing ray-grafs-feed, is along with a crop of oats or barley. When fown along with barley, it is neceffary to roll the field, that fo the fap may be the better preferved at the dry feafon of the barley-feed; if it is not rolled, it is neceffary to harrow it well; for the better that land is harrowed, it becomes the firmer. When land is left open, the drought, which is very common at the feafon of the barley feed, eafily penetrates it, and thereby prevents any feeds, which ly near the furface, from vegetating. This precaution is not fo neceffary when the rye-grafs feed is fown along with oats. The land on which oats are fown, is, generally fpeaking, from its culture, firmer than the barley land. Befides, the feafon of fowing the oats, is earlier than the feafon of fowing the barley; and therefore the land, at the time of fowing, is always fufficiently moift, fo that the grafs-feeds are able to ftrike root before the drought fets in.

This kind of grafs feldom hurts the crop of corn. When the

the soil is open and loose, it is of advantage: it firms the soil, and thereby prevents the corn from lodging.

Though the common way is to sow the rye-grass seed with corn, yet when the land is poor, it is a better way to sow it by itself; and still a better way to summer-fallow, and sow the seed in the autumn. In this case, if the land is well plowed, though not very rich, it will produce a tolerable crop. But as the land by the fallowing is made open and loose, and as the plowing and sowing are near to the rainy season, it becomes necessary to prevent all cattle from pasturing upon it, or even touching it during the winter, except in the time of hard frost: For the cattle in pasturing, if the land is not firm, are not only in danger of pulling up the young plants, but also of doing great damage with their feet.

Though the land sown in the spring with this seed, has longer time to settle before winter, than what is sown in the autumn, yet the farmer should be careful not to allow much pasturing upon it, especially in wet weather, except the autumn has been remarkably dry. The corn growing along with the rye-grass keeps out the drought, and in some measure too keeps the soil open, by the shaking of the stalks. When the seed is sown by itself in the spring, cattle may be allowed, with greater safety, to pasture upon it in the winter; for the summer drought penetrates deeper, than when corn grows along with the grass; the roots of the rye-grass, having nothing to interrupt their progress, spread more along the surface, and the blade giving very little resistance to the wind, the soil is less shaken. But though the sowing rye-grass by itself in the spring has this advantage, yet there is an inconveniency in this, that must be attended to. Weeds naturally rise along with the rye-grass sown in this manner, and, if allowed to stand, they come to perfection, sow their seed, prevent the grass from covering the surface, and keep the soil open by their motion. This makes it necessary to choose

choose very clean land for the rye-grass, when it is to be sown in this manner, or to cut down the weeds when they come up, which indeed may be done at a very small expence.

Rye-grass seed is sometimes sown for hay, and sometimes for pasture-grass. When for hay, there are commonly sown upon the acre from 2 to 4 firlots, wheat-measure; when the land is much infested with weeds, the more seed is required, whether it is designed for hay or pasture.

Rye-grass rises very early in the spring, and, if the soil is dry and warm, affords a good pasture all the winter. It is very hardy, stands the frost, and, if continued in pasture, does not wear out in many years. The proper way of using it is, to eat it down in the spring and beginning of summer, and after that to let it rest till the autumn. When it is allowed to get up in the summer, it runs to the seed, and becomes disagreeable to the cattle. But if it is eat down early, this inconvenience is prevented, and by this management too a good crop may be expected in the autumn. This way of manageing rye-grass may be the more freely recommended, as it can be done by the farmer without any difficulty.

The rye-grass makes very good hay, when properly managed. There is such a demand for the seed of this grass, that the farmer is often tempted to let it stand till the seed is perfected, and then to thrash it. When this is done, it cannot be expected that the hay can be good. The sap ascends from the stalk to the seed: Before the seed is formed, the stalk is full of sap: As the seed ripens, the stalk loses its sap; and when the seed is perfected, the stalk becomes withered and dry, and contains very little nourishment. If regard therefore is to be paid to the goodness of the hay, in the culture of this grass, it should be cut before the seed is ripe. When the stem has attained its full height, and the seed completely formed, 'tis probable that the plant then contains the greater plenty of juice, and that, if cut in this situation, the hay is best and the crop greatest. All the ancient writers

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are of this opinion. Cato directs that the hay be cut before the seed is ripe. Varro, that it be cut when it ceases to grow, and begins to dry. And Columella, after giving the same direction, adds as the reason, that when the grass is cut in this situation, the crop is greater and the hay more agreeable to the cattle.

As rye-grass, when cut as soon the seed is formed, affords the best crop of hay, so this management makes the crop less severe upon the land than when it is allowed to stand longer. It is certain that plants, when they are allowed to bring their seed to perfection, exhaust the soil much more of its vegetable food, than when they are cut or pulled up before this. A crop of turnip is an easy crop, when the turnips are pulled up for the sake of their roots; but, if allowed to stand for seed, there is not a crop more severe. When the farmer then proposes to cut his rye-grass for hay, and to take crops of hay for some years successively, it is necessary that he cut it before the seed is ripe. By this management, his land carries better crops while in grass, and is in better order when broke up again for corn. If the grass, by being cut a little earlier than ordinary, should not produce so large a crop of hay, as it would have done, had it stood some time longer, it is probable that this loss is made up in the goodness of the fog. For the earlier in the season that the grass is cut, the fog is always the better, and good fog is often in proportion more valuable than a good crop of hay.

When the hay crop is the principal thing intended, the fog should not be touched, but allowed to rot in the winter. The cold drives back the sap from the leaves into the root; by this the plants are strengthened, and able to produce a greater crop in the summer. By this management some persons have had good crops of hay for 14 or 15 years successively, without any dung, and it is probable that, by the same management, good crops of hay may be got for any number of years.

ARTICLE XXXII.

The advantages of Shallow Plowing ; by Mr GEORGE CLARK.

From Essays and Observations, Physical and Leterary.

IT is some years since I first learned from gentlemen of observation, that the farmers in Norfolk, and the neighbouring counties, plowed very shallow, and, notwithstanding, raised good crops, and were esteemed good husbandmen.

Some are convinced from what they hear or read ; nothing will make impression upon others but ocular demonstration ; and, for my part, I am of the last class, an unbeliever, that could not see the weight of the arguments advanced in support of the practice, till I had an opportunity of travelling through that part of the kingdom, and observing the management of the gentlemen and farmers, which of late has raised the county of Norfolk in particular, from a state of poverty to that of plenty and great affluence.

That the import of the following observations may have the desired effect, it will be necessary to give a short account of the natures of the soils where the practice is followed.

It was in Lincolnshire where it first drew my attention, and induced me to measure how deep they went with the plough ; which I found, after many accurate trials, seldom exceeded two and a half, and never, that I remember, three inches.

The high lands of this country consist commonly of a light sandy soil, that seems to be formed by the air and rains breaking and crumbling down a bastard lime-stone, that lies in most places only a few inches under the grass, dipping and rising according to the depressions or elevations of the county,
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but in general hanging to the east. Little or no water remains here on the surface; for the stone being open, it sinks as it falls from the heavens, and never appears again till it comes to the level of the marshes, or fen-country, where the soil may be said to have no bottom, at least it is deeper than can be reached by any method of culture.

The high grounds are for the most part common, or employed in pasture for sheep. The low or fen countries have now and then also very extensive commons; but the rest of the country is well divided and inclosed, the soil rich, and producing, when in tillage, weighty crops of hemp, flax, turnip, barley, grass seeds, wheat, oats, and, when laid down, the best pasture for cattle of all kinds.

What may properly be called the high grounds of Norfolk, are generally covered with a very thin light soil; the low lands are of the same quality, but the soil deep, occasioned by washing or blowing from the higher parts.

The brooks and rivers run in extensive marshes, made by the springs breaking out on their sides; for, as the whole country seems to lie upon one lump or mass of grey chalk, which they call marle, the superficial water sinks quickly, and, as was observed before in Lincolnshire, does not appear again till it reaches the level of the marshes; and it may be taken for almost an universal rule, that, under any extent of country where the water sinks in this way, the greatest part of the *strata* will be found calcarious or lime-stone.

Derbyshire produces many instances of this.

The number of chalk or marle pits, every where opened up in Norfolk, give great opportunities of seeing the nature of the *strata* that lie nearest the surface.

The staple is generally of the light soil above mentioned, then a brown oker coloured sand, mixed with pieces of flint, very dead in its nature, and seems to contain not the least principle of vegetation, but is, in my opinion, a certain sign that the chalk is at no great distance; and it is common to

observe deep holes in the chalk, which is otherways very solid, filled with this sand. They have also clay-lands; and, when any considerable quantity of chalk is mixed with it, they give it the name of clay marle, and esteem it the best for the improvement of light land.

What they call *cragg*, is no other than banks of sea shells, though they are now and then found at a considerable distance from the present shore; it is a very valuable manure, and highly esteemed.

It would spend too much of the Society's time to mention the nature of the soils in the neighbouring counties, where the same practice is followed, and where they have also very stiff clays, all plowed in the same way, never going above three inches deep, and seldom above two and a half, whatever be the soil or intended crop.

The reasons that the farmers and gentlemen give, are,

That land turned up with a shallow furrow will produce an equal or better crop than when plowed deep, even tho' the soil should allow them to go down any length; for that by plowing deep, they would turn down, and hide from the influence of the weather, the surface and best part of the soil, enriched with the roots of plants, &c.

That by repeated experiments, they found, that ten cart-load of dung or marle will go as far in improving an acre of land, when only plowed three inches, as twenty would do of the same manure, if they plowed six inches; and so in proportion; and that, by the same rule, manure may be carried to advantage double or triple the distance.

That as the work is lighter, fewer cattle and servants are necessary to carry on their husbandry.

That land plowed shallow is much easier cleaned of weeds, as their roots are with less trouble exposed to the sun and wind, and the seeds of annuals brought nearer the surface, and by that means encouraged to vegetate, which is necessary before they can be rooted out and destroyed.

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Should their marle or manure go down, it is easier brought up than when sunk in a deeper furrow, where the air and weather can have little or no influence.

If ground is stoney, it will be cleared with less or more trouble in proportion to the deepness the plough runs.

That shallow plowing will bring always the earliest crops, which are found, at least in all cold countries, to be the best.

That the farmers in Norfolk are in a better channel of improvement than their forefathers, none will doubt who knows how much the rents and wealth of that country are increased. But some may alledge, that, if they plowed deeper, the improvement would be greater. I doubt greatly of this, when I compare the soil and rent paid by them, with the soil and rent paid in other parts of England; for in Norfolk there are large tracks of land, for which the farmer pays to the landlord twenty shillings per statute acre; and when this is the case by agreement and common custom, the tithe is five shillings, and the poor rates three shillings, or three shillings and six-pence, all paid by the tenant. The statute-acre being as four to five of ours, a fourth part of the above sums must be added to the account; which will then stand thus, when reduced to our measure,

To the master	L. 1 0 0
To the church	0 5 0
To poor rates	0 3 6
To allowance for the difference of the statute English acre for ours	0 7 0
Total	L. 1 15 6

It is true, that several of the old leases, granted when they first began to improve, still continue in force, and that by these the farmers are only obliged to pay from seven to eight shillings per acre, and the tithes and poor rates in proportion: But it is as certain, when any of these leases fall, the grounds
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are never let under double the old rent, and most frequently at the rate above mentioned.

Their wheat and oats are good, their barley is esteemed the best, and their crops of turnips are heavier than in any other part of England. Some roots arriving, by the common culture of the county, namely the hand hoe, at a size greatly surpassing any thing we yet know of, though raised in the horse-hoeing way.

I humbly apprehend, arguments from what we observe of land lying in a natural state, may be even brought to support the practice: But this paper being drawn out already to too great a length, I shall only here remark,

That where lime stone or chalk comes near the surface, there the effects of it are seen upon all roots, plants, and trees, but when it lies only a few inches under the surface, perhaps not above eight or nine inches under the grass, and in a horizontal position, from which there is no washing, then it appears not to do the least good to what is above it, but lies dead till exposed by some accident to the more immediate influence of the weather.

The flat moors in Yorkshire produce many striking examples of this; for, where on a level, they are covered with nothing but heath; but on the sides of declivities, where the lime stone beds break out to the day, there the sward is green, and covered with the best kinds of grass, the water that runs over and washes the lime stone, impregnating all below, till it meets with an opportunity of sinking; then the heath again takes place, till a new bed breaks out; and it is most remarkable, that all kinds of cattle will feed fat in two thirds of the time upon what is called a lime stone bottom, that they will do upon any other unlimed land; the same effect may be produced by bringing a sufficient coat of lime, upon the surface of the heath or grass.

When we enrich old grass by dunging, the dung does not go down any considerable length, but will be found, for many
years

years after, remaining on the surface, at least, the earthy part of it.

That if trees are planted too deep at first, they make no progress till the roots rise, and run alongst the surface. Even old trees do not push their roots downwards ; and though the weight of the trees depress that part of them which join the trunks, yet these, when at such a distance as not to be influenced by the incumbent weight of the tree, rise to the top.

Some experiments are now trying, to determine, whether the same practice of shallow plowing will answer here as it does in Norfolk, and other places of the world. For tho' I have had no opportunities of seeing their method, yet there is reason to believe it answers in many of the southern climates, where, from the accounts given of the nature and number of cattle they employ in working a plough, it is impossible to suppose they go deep ; and if it is found to answer in these countries, where the heats are frequently too great, ought it not to be attended with great success here, where the sun has much less influence, and where our crops are frequently lost for want of warmth to bring them to maturity ?

A R T I C L E XXXIII.

Observations upon the foregoing Paper concerning Shallow Plowing ; by LORD KAMES.

From Essays and Observations, Physical and Leterary.

HOWEVER much shallow plowing may have prevailed in particular spots, or even in a whole county, one will be apt to suspect that it is owing to necessity or indolence, especially as the opposite practice is every where adopted in theory. At the same time, every man of science must

must be acquainted with many favourite topicks, that, after a long establishment, have been overturned by the most satisfactory experiments. And among the numerous maxims in art, as well as in science, that at present pass current, it is probable that they would not all of them stand the test of accurate and bold enquiries. For that reason, I gladly pay my tribute of praise to the author of this paper, for his freedom of inquiry; though I am not convinced, either by his authorities or reasonings, that, in general, shallow plowing, is best: that is, where the plough is kept within three inches of the surface.

A practice established upon sensible principles, ought to be much regarded; not where it is derived from ignorance, chance, or prejudice. Husbandry is yet in its infancy, and the bulk of its practice hitherto is, I am afraid, derived from one or other of the sources now mentioned. Practice, therefore, ought not to have great weight in husbandry: and, were it to have weight, it would lie against shallow plowing; for in Britain, at least, I presume, that deeper plowing prevails. And if we were blindly to follow authority without reasoning, I should certainly embrace deep plowing, which, as it is attended with additional expence and trouble, could not readily have become general, but from the experience of greater profit.

At the same time, there are particular circumstances in which shallow plowing is best; and if these circumstances occur in the examples given, the practice is so far good, without having the least weight in the general point. The first example of shallow plowing, is in the fens of Lincolnshire, where the ground is tender and moist. In a soil of that kind, the roots of plants, to avoid a superfluity of moisture, cannot be kept too near the surface; and to this end shallow plowing certainly contributes.

The next example is Norfolk, the surface of which is described to be a thin light soil, covering an oker-coloured sand

land, dead in its nature, and unfit for vegetation. Shallow plowing here is a matter of necessity, and not of choice; for one cannot with too much care avoid such a bottom. The third instance, indeed, of plowing shallow in stiff clay, would deserve the greatest regard, were it vouched to be the result of rational experiments, after many comparative trials; but, for aught we know, it may be the result of imitation only. In the neighbourhood, shallow plowing is proper; and the example is perhaps blindly followed, without attending to the difference of circumstances.

Dropping then authority and practice, from which so little satisfaction can be obtained, the only resource left us is, to recur to principles and rational considerations; which, at the same time, I am afraid, will not carry us far; as several articles are necessary to be established by experiments before a conclusive argument can be formed. One capital article is, at what depth from the surface roots produce their strongest effects? Concerning this article, there is nothing ascertained with any degree of accuracy, further than in general, that some roots pierce deeper than others, and that many roots, even of corns, produce vigorous effects much lower than three inches. Were arguments *a priori* to be trusted, independent of experiments, one would believe, that roots are always in the most advantageous situation where nature places them; and that, accordingly, a plant thrives best with downward roots, where nature gives them that direction. If this proposition hold, to which we may trust till the contrary be demonstrated by experiments, it follows, that shallow plowing is proper for those plants only which extend their roots horizontally.

But as, besides lateral or horizontal roots, the bulk of vegetables push many roots downward much deeper than three inches, the benefit of deep plowing for these plants will appear from the following considerations:

In the *first* place, it gives room for the roots to extend themselves

selves according to the direction of nature, which, it is presumed, will contribute to the vigor of the plant. This argument goes upon the supposition, that the soil, as far as pierced by the plough, is proper for vegetation, either naturally, or made so by culture; and it must be kept in view, that every inch of the staple comes in succession to be at the surface, and gets the benefit of the sun and frost.

Fourthly, In this country, I doubt whether, by shallow plowing, winter-grain can be sufficiently covered to prevent soil; because I imagine, that a plant receives the greatest proportion of its nourishment from the roots nearest the surface. But at I have little doubt that some nourishment proceeds from the deepest roots, I conjecture, that all other circumstances being equal, the fertility of the soil bears a proportion to the deepness of the staple.

Thirdly, I lay great weight upon the following considerations: I am greatly inclined to a theory that of late years is creeping into reputation, *viz.* That moisture is the *pabulum* of plants: That the earth serves no other purpose but to be a receptacle for moisture; and that the richest soil is that which furnishes a due proportion of moisture to its plants. Now, let us compare a shallow and a deep staple with respect to moisture. Where the staple is shallow, the roots, which cannot pierce the hard ground below, must spread along its surface. In that position, they are drenched in water upon every severe shower; and this moisture lies so near the surface, that it is immediately sucked up in time of drought, and vanishes by evaporation. Thus it is, that the excesses of drought and of moisture alternately are the consequences of a shallow staple. A deep staple possesses the opposite advantages. The moisture lodges below the bulk of the roots, and becomes a reservoir, which supplies moisture to the roots above, even during a pretty long drought.

Secondly By deep plowing, the staple is doubled or tripled. I do not say that this doubles or triples the fertility of the

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the piercing frost. The seed ought not to be laid at the bottom of the staple; because the hard ground below is very improper to receive the tender roots. And if it be laid any way near the center of the staple, the earth above will not be sufficient to give it a good covering.

Fifthly, We know by experience, that couch-grass, thistles, and many other hardy weeds, root themselves in the ground much deeper than three inches. These are not to be eradicated but by deep plowing; and deep plowing, once begun, must be continued; for the under staple left deserted is soon filled with weeds, which will destroy what is sown above them.

The reasons given by those who practise shallow plowing, weigh not much with me. The *first* is, that the surface soil, enriched with dung and roots of plants, which is by far the best, will, by deep plowing, be buried, and a soil worse in quality be brought to the surface. This inconvenience, I grant, will follow, the first time the ground is plowed deep; but then this is but a temporary inconvenience, and will soon vanish, to give place to a solid improvement. The rich surface-soil will not suffer by being laid at the bottom. But the bottom-soil brought to the surface will soon be enriched by dung, and by the influence of the sun and frost. The staple being thus enriched throughout, the turning over the soil will not thereafter have any bad effect; nay, it will have a good effect, by employing soil that has in some measure been long rested.

The *second* reason concerns manure: It being urged, that ten load of dung will go as far in improving an acre, having three inches of staple, as twenty will do where the staple is six inches. I acknowledge, that it will improve three inches; but I deny, that the acre will be equally improved with ten as with twenty load, till it be proved against me, that three inches of staple are as good as six, which is the very question that is in dispute.

I admit the *third* and *sixth* reasons to be good, as far as they go. A shallow staple is frugal, not only in the first formation, by saving labour in clearing it of stones, but also by saving labour in plowing. But it remains to be determined, whether that circumstance be sufficient to overbalance the advantages of a deep staple.

As to the *fourth* reason: I deny that weeds can be best cleared by shallow plowing. On the contrary, as above hinted, I do not find it practicable to clear the ground of weeds without deep plowing.

As to the *fifth*: Manure that falls to the bottom, is no doubt easiest brought up where the staple is shallow. But that very supposition, if it hold in fact, must necessarily introduce deep plowing. For manure that hath subsided to the bottom of the staple cannot be brought up without going under it, and entering upon the hard ground below; and this operation two or three times renewed must produce deep plowing.

The reason *last* urged is: That shallow plowing brings an early crop. One thing I know, that the weakest crop is always the earliest. If shallow plowing bring both an early and plentiful crop, this must be acknowledged a great property. But I must take the liberty to doubt of the fact, till it be ascertained by regular experiments. With respect to winter-crops, the probability lies the other way. When seed is laid deep, supposing always that it is not buried, it has a warm bed, and is the better protected from frost. This ought to contribute to an early harvest as well as to a plentiful one. Another consideration concurs: Wheat is a tall crop, and is apt to wind-wave where the roots are not laid deep in the ground; and this must retard its growth. Barley, I acknowledge, is the better for being laid near the surface, where dews and the heat of the air may easily penetrate. Its growth is also at
that

that season of the year which is the least infested with winds.

Upon the whole, though I lean to deep plowing, I am far from being rivetted in my opinion. We can trust little to experience, and the foregoing reasonings are too slight to afford solid conviction. Here then is a fair field opened for rational experiments; to promote which, the Society will esteem it their greatest honour: And they certainly will be well pleased to find experiments upon this head promised by one of their own members in the paper which has given occasion to the present observations. Experiments cannot fail to succeed under the direction of a man whose accuracy is not inferior to his knowledge.

ARTICLE XXXIV.

Observations upon our Extracts from the FARMER'S KALENDAR—Observations on the use of Lime—A mistake of Mr YOUNG'S—Extract from a Kalendar kept by a Farmer in the month of January.

[In a Letter to the publisher.]

ALTHOUGH I have always held the name of a critic in contempt, yet when the public, in matters of such importance as essays on Agriculture, is presented with error glazed over with rhetorical decorations, it becomes every lover of his country to trace out and endeavour to explode it. For this purpose I send you this letter, and sincerely wish you would anticipate any remarks of this kind for the future.

The extract from the FARMER'S KALENDAR in your first number, p. 15. seems to be a prelude to a complete abridgment of
that

that sensible performance, tho' I beg leave to add, not complete for any country, nor adapted especially to the Northern parts of this Island. There are many of the most ingenious observations of the best English authors, which, were we implicitly to follow, would lead us into mazes productive of the worst consequences. Therefore I wish you would give your readers compends of the most useful papers on husbandry formerly published, illustrated with your own remarks, adapted to the climate and present times, rather than long winded extracts. If you fill your next twelve numbers with the *FARMER'S KALENDAR* *verbatim*, I, as well as another of your readers here, would choose to give them up altogether.

Mr

† We are sorry any of our correspondents should take exception at our adopting the *FARMER'S KALENDAR* into our collection. We were first advised to it by a correspondent, to whose judgment some deference is due. And we are happy to find, that our conduct, in this particular, is greatly approved of by severals, and condemned by none, so far as we have access to know, but this gentleman and his friend. We introduced it with a proper caution, (Vol. ii. page 15.) and have been, and shall be careful, to adopt only such parts of it as may be useful to the *SCOT'S FARMER*, leaving out all those which have little chance to be of use to him, and are calculated either for the more improved state of farming in England, or for provincial crops, such as madder, liquorice, hops, &c. In general, we must beg leave to observe, that no rules, or instructions, however pointed, can, in farming, be implicitly followed. A variety of circumstances, which it is impossible the writer can have in view, make that impossible or improper. Much must be left to discretion: And if this *Kalendar* is perused with discretion and judgement, (and we trust, we publish for the use of reasonable men) we flatter ourselves, not from our own opinion alone, but from the approbation of others, it may be of great service, not as a directory only, but as a pattern, upon which every farmer may be led to form a *Kalendar* for his own use.

Mr

Mr R. G. in his letter p. 29, disagrees essentially with the best farmers, in his directions relative to liming, where he advises two years fallow before laying it on; for they universally acknowledge, that the more that limed land is plowed, the sooner it is reduced to a *caput mortuum*, and the lime admitted through the too porous mould, to a depth beyond the reach of the plough.†

The ingenious Mr YOUNG, has made the following mistakes in the excerpt taken p. 53. from his Farmers Letters. He charges simple interest only on the L. 71 sunk on the improvement of the wet pasture; whereas 10 per cent is rather too little. He then calculates the 20 acres at 12 shillings; when in reality he has only 6 shillings by his own estimate. Thus he states 20 acres at 12 shillings per acre at L. 240 in 20 years; when it is only 6s. or L. 120. But allowing the land to be worth 18s. after improvement, the calculation will stand thus:

Interest of L. 71, at 10 per cent, for 20 years	L. 142	0	0
20 acre improved to 8s. in value, for 20 years	160	0	0

The difference is only

L. 18 0 0

or 10½d per acre per annum. And besides there should be subtracted the value of half an acre, that must be allowed to be lost by the ditches.

If

† We apprehend, of the two dangers here mentioned, the last is the only one to be dreaded: For that limed land is reduced to a *caput mortuum*, only by a successive course of cropping; and that the ground, being kept stirred by plowing, is in a fitter situation to receive, and be incorporated with the lime, and thereby made sooner ready for yielding the benefits of the lime: But the sooner it is laid down to rest with a crop of grass, the longer will the benefits of the lime be felt.

If you please, you may make use of the following abridgement of my January Kalendar ; and, if agreeable, shall send you as much every month.

Keep sheep partly on turnip ; allowing them to provide for themselves in good weather. Litter all sorts of cattle well ; especially penned sheep, and fattening beasts. Feed swine on the refuse of the dairy, kitchen and garden, which should now be trenched ; also on boiled-parsnip, carrots, potatoes, and bran ; and the juice of the horses boiled-meat, and keep them clean. If fresh weather, plow lea ; if frost, cart manure, and make composts. Thrash your corns just so fast, as to serve your cattle with food and litter. Make ditches and drains ; plash hedges ; catch moles ; lay open ant-hills ; and look well to the forward lambs. Uncover the roots of trees ; dung new-planted ; and fell all kinds, except resinous ones. Cut all dead branches off fruit-trees ; transplant young ones ; trench ground, and feed pigeons. Water-grass lands ; cut hedge-rows ; lop forest trees ; gather stones ; plant quicks. As the calves of this season are generally good, and the milk very scarce, they may be fed on the juice of the barley, which many farmers boil to their horses and cows, or on the juice of boiled-hay, mixed with a little flax seed, or hemp-feed, bran, and $\frac{1}{4}$ part milk. On either of these they have been fed in great numbers.

I shall conclude, with begging you would give your Readers some abstracts of the acts of parliament which particularly respect Agriculture. Your constant reader,

PHILAGROS.

ARTICLE

ARTICLE XXXV.

Query concerning cropping a field.

[From RUDDIMAN'S WEEKLY MAGAZINE]

THE use and design of every periodical production is to convey instruction and amusement; therefore essays and questions relative to trade, manufactures or agriculture, are highly useful and proper: In the last of these branches I have hitherto been employed, and I have been induced to give you the trouble of this, to beg the advice of some of your sensible correspondents, with regard to the cropping of a field, about which I have some doubt: in order thereto I must necessarily inform in what manner it has been managed for these last three years.—The soil is a light sharp loam, of a south exposure, and wetish, owing to some springs or spouts, which, as it is a hanging bank, had soured the under part of the field so much, that it was never known to produce any thing, except in a very dry season: the way in which the ridges lay contributed a good deal to make it still more so. In summer 1771, it was thoroughly fallowed, levelled, and straightened up into narrow ridges; in spring 1772, it was sown with barley and clover, without any dung; the barley, which was sown thin on purpose for the grass, was tolerably good: care was taken to keep cattle from poaching it in winter; and in spring last the clover had a most vigorous and promising appearance, but was greatly hurt by the excessive drought of the summer.

The crop, however, was thick, and middling good, was cut early, and mixed with straw for winter fodder. The seasonable rains in the end of summer raised a better second than first crop, and which was plowed in with a stout fur.

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It may be necessary to mention that, notwithstanding the fallowing, levelling, and straighting into narrow ridges, the field was far from being thoroughly dry; this obliged me, upon the first crop of clover being cut, to make it effectually so, by running a great many rumbling sewers through the springs or spouts, and the water discharged from these was carried off by a main drain; by this means it was perfectly free from wet; and the fallowing having sweetened the parts formerly soured, it has lain all winter in the most dry and healthful situation.—Now, Sir, what I want to be resolved in is, Whether this field, treated as already described, ought to be sown with barley or oats for the following crop? If with oats, Whether it would be adviseable to sow them on the winter fur, or in what manner? If with barley, the method of preparing for that crop? Clover is again intended to be sown, and for the same purpose of plowing in.—Farmers out of the reach of great towns, and so situated that dung cannot be purchased, will (if they are industrious) endeavour to substitute something in its place: and what so obvious and easily attained (lime, marle, &c. in their proper places excepted) as this method of procuring vegetable manure, of which there is great variety, and which, I am confident, would have an excellent effect, if used upon soils accustomed to town or farm-yard dung?

As the season for sowing oats is at hand, by inserting this in your first number you will oblige several of your readers in this neighbourhood, who have advised differently, but who are all willing to take this method of being resolved as to the properest manner of procedure in this case.

Yours, &c.

Fife-shire, March 10.

A Practical Farmer.

T H E
SCOTS FARMER,

APRIL 1774.

ARTICLE XXXVI.
FARMERS KALENDAR.

M A Y.

Farm yard.

ABOUT the 12th of this month the Farmer may calculate, that he will have a sufficient bite of grasses to leave off foddering entirely, and before that he should not think of it; for if cattle are turned into grass not sufficiently advanced in growth, they will require such a number of acres, that your mowing ground will be greatly curtailed. As soon as your yards are cleared, the dung in them must be turned over, and mixed carefully with the stuff beneath, whether it be chalk, marle, turf, ditch earth, or whatever sort; for this purpose, you must set many hands to work on it, so as to get it done as expeditiously as you can, because it should lie a little after turning, before it is carried on to the land. It thereby undergoes a fresh fermentation, and becomes more rich and rotten. The method in which the men should do this work is, to begin and throw the dung up against a wall, or into some vacant space, so as to have the command of a trench to work in; they should always keep this trench three or four feet wide: Then they draw down with dung cromes the dung, and breaking it to pieces with forks, throw it up on the part already mixed in a spreading manner, so as to cover all the chalk or earth. In this manner they proceed with the dung, to the breadth of about

eighteen inches, or two feet, till they come to the stuff under it; all which they pull down with pick axes or mattocks, and, when it is in the trench, break it further to pieces, so as to have it fine; that is, no pieces larger than a man's wrist. If water hangs in any places in their trench, they should have a water bowl ready to throw it on to the part they have mixed. If this work is well executed, you will have a large hill of excellent manure ready to lay on to the cabbage or turnip land, to be turned in by the last earth.

Respecting the quantity: Therein lies the proof of your being a good farmer; perhaps the most important convincing proof that a farm can offer. If you have managed well, you will have from fifteen to twenty loads for every head of great cattle, and about ten loads for every hogg, not reckoning piggs; not above a third of the whole marle or earth. Every trussed load of straw, trampled into dung, will make you fix cart ones of dung, exclusive of any mixture. The loads I mention are large cart ones of forty bushels.

But the earth which has layen under the dung all winter, and received all the urine of the cattle, must by no means be reckoned as inferior to the dung itself. It is become a rich manure without mixing with dung, richer than the best of marles: And I am well persuaded, that this retention of the urine in it, is of such consequence, that the whole compost, when well mixed together, will be better than if chalk or earth had been brought into the yard, at least for most soils. But that the favourable circumstances of the conduct much exceeds the expence of it, for all soils, cannot for a moment be doubted.

But a very great recommendation of this farm yard system is, the cheapness of thus manuring land: The farmer will find, that he can in no other method manure, at near so small an expence; all purchased manures come much higher, many of them five times more expensive in proportion to their value.

In many situations there are no manures of any sort to be purchased: in which the farmers, if they do not adopt such a plan as I have mentioned, must give their land a poor chance; for it must be an admirable soil, or a most excellent course of crops, to render manure unnecessary.

Cattle in Grass.

When you turn out your cattle, whether cows, fatting beasts, or young stock, it is highly requisite to consider the best method of feeding the grass: There are two opinions on this point directly contrary to each other: 1st, It is asserted by one set of grassiers, that let your grass to be fed consist of ever so many acres, that the cattle should have it all at once; If it is divided into eight or ten fields, the gates of all to be set open for the stock to feed where they like. 2dly, The other set advance, that large fields of 50, 80, or 100 acres should be divided, that the farmer may change his stock from one to the other, and give the grass fresh and fresh. And each of these parties assert, that they know themselves to be right from experience. But that is impossible; one must undoubtedly be wrong. Let us consider the point from reason: It is one that will never be decided fairly from experiment; for two pieces of grass, each of 80 or 100 acres, contiguous and perfectly alike, are not to be met with in the king's dominions; and if they were, two sets of stock, exactly similar, would not be found. The divisions into fields by hedges and ditches, for the purposes of draining and shelter, is not the inquiry, the comparison not being fair; as such divisions may be fed at once, by setting all the gates open, as well as one field. The inquiry is, Whether the cattle will spoil the grass more in one way than in the other. And whether the grass will go as far in one as the other, by fatting or feeding the beasts as well? The argument of giving the grass fresh and fresh appears to be a vague one; for it supposes that the cattle will not eat it the same, if they have the whole range at once, which

which is certainly a mistake : They will not be seen in the evening where they were feeding in the morning ; but vary their food in the manner most agreeable to themselves. And we may in general observe, that the sagacious animals, when left to their own conduct, manage such points much better than we can for them. As to the treading and spoiling the grass, it is an equal objection to both methods ; for I do not see any difference ; the legs of the beasts are not tied in small closes any more than in large ones.

In case all the smaller pieces have not water, the objections to feeding them separate are much greater.

Further, in the stocking grass-lands, the farmer should attend well to the proportion between his flock and the quantity of his feed. Let him remember when he stocks his grounds, that he should be pretty nice in this proportion ; for if he overstocks, his loss will be certain and great ; and if he does not throw in as many cattle as he ought, then he will suffer in his profit.

There are two principal divisions in fattening, to buy in your beasts in October or November, and put them to straw till the end of February : then to begin their fattening on turnips, and continue it through March ; from thence to the middle of May on the large Scotch cabbage, and then to turn to grass, and kill in August or September. The other scheme is, buy in smaller beasts the middle of May lean, and sell them fat from the grass in the October and November following. Where winter-food is raised with spirit, and the farmer takes a proper care to provide great plenty of litter to turn into dung, the first method is much the most profitable ; but where either of these requisites are wanting, the latter is preferable.

Buck-wheat.

After the 10th or 12th of May to the end of the month, is the proper season to sow this grain. So late a time has offer-
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ed the opportunity of perfect tillage to destroy weeds, and of course the land is fine, and in good order. Plow once more, and harrow in the seed on one earth. It is a most profitable crop, and especially on all (except very heavy soils,) land that either requires late sowing, or that you are disappointed in the design of sowing soon enough to barley. Late sown crops of the latter grain are seldom good enough to pay expences; in such cases, it is of very great utility to substitute buck-wheat; for I do not think the soil exists, on which a crop of buck-wheat sown in May, will not exceed in value a crop of barley sown in May; and yet in many tracks of country it is a common custom to sow barley so late as that season.

Lucerne.

This is a very good season to sow lucerne in; this grass being a perrenial, and, when well cultivated, yielding an immense profit, too much attention cannot be given to lay the seed in the ground with all possible advantages; that is, the land should be perfectly free from weeds, very rich, and as fine as any onion-bed: now all these requisites a man may not be able to procure in April. In such a case, let him not sow in April, but wait till May; and this whether you drill or sow broad-cast: If the latter, let it, by all means, be with buck-wheat, which is far preferable to sowing it alone.

Sainfoine.

Sow this grass also with buck wheat: You need not fear success if your soil be proper; for hay in countries where natural meadows and pastures are scarce, sainfoine is so valuable, that this culture should be attended to more than it is. It is a common notion that this grass will thrive only on lime stone lands, or chalky soils; on those that are quite dry, and have at the same time a stratum of rock or chalk, to prevent the roots penetrating into a wet clay, as it is well known those

those soils have no such bottom. This circumstance excludes very extensive tracks in many parts of the kingdom, where fainfoine would be a most valuable acquisition, but it is much to be regretted, that we should not experimentally know the truth of these assertions. It is a misfortune, that some experiments are not published to prove, that this grass will not thrive on gravels, loams, &c. &c. particularly those that are dry. General ideas, the result of ages of practice, are admirable guides to tell us, what will do; but they are miserable conductors in informing us what will not do. The common farmers never blunder in the general practice of the former; but almost always in the latter.

Carrots.

If the carrot crop was not hand-hoed last month, it should be done this; the men should execute it with four inch hoes, moving along on their knees as directed in April; and those crops which were then hoed for the first time, will require an harrowing early in this month, and a second hand hoeing about the last week. The harrowing will not damage the young carrots, nor pull up one in twenty; but it will displace the weeds set again by rain, and check the growth of those that are got up since. The other hand hoeing should be performed with nine inch hoes: The men to stand as at turnip hoeing, and they should set out the plants to the distance of fifteen or eighteen inches from each other. Gardeners do not let them stand further than eight or nine inches asunder. But, when the roots are designed to be of a large size, that is much too little: The crop will, in very good or well manured land, measure more bushels at a larger distance. These observations are equally applicable to parsnips.

Potatoes.

Potatoes.

Some time during May, the potatoe crop will require a complete hand hoeing, which should be done with good attention, that not a weed may be left, and the surface of the land be left well cut and in fine order. Crops in rows should receive, besides this hand hoeing, the first horse hoeing which should be given with a common swing plough, drawn by two horses one before another, and turn a furrow from the rows, throwing up a small ridge in the middle of each interval. May is a month that requires these operations to be well and attentively performed; for the weeds grow at a great rate, and without such an attention will destroy, or, at least, will greatly damage the crop.

Cabbages.

The crop of cabbages planted in April, will require a hand hoeing this month. It should be given only to the tops of the ridges, about eight or nine inches around the plants: The weeds should be cut up clean, and loose moulds drawn to the stems of the plants. In about ten days after, the first horse hoeing should be given, turning a furrow from the plants, and throwing up a ridge of earth in the middle of each interval. This operation will be of great use: it lets the sun into the ridges on which the plants stand, and consequently sweetens and ameliorates the soil, and it kills the weeds that grow on the sides of the ridges, much cheaper than it can be done by the hand hoe: It likewise pulverizes the earth taken away, and exposes it for some time to the sun, to bring it into fine order for returning to the plants in June, when they will strike into it, and thrive the more for such treatment.

The land designed to be planted in June, should this month receive an earth to throw it on to whatever sized ridges you intend to plant on. This must not be omitted, because
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the beginning of the next month will be taken up in carting on the manure.

Wheat Fallow.

If the farmer fallows for wheat, which is however but an unprofitable practice according to the modern ideas of husbandry, the land should receive an earth this month to turn in the weeds that have arose on it since the last. The maxim of making the fallows very fine in April, to destroy the weeds by a plowing in May, or the beginning of June, is, in general, an excellent one; for how are they to be killed if they do not vegetate? If the fallows are left rough in the common manner, the seeds of weeds are shut up in the clods: They are broken by the time the wheat seed is sown; must not the consequences be their growing among the wheat? But it has been urged, that on rich clays this practice will not be proper on account of such spring tillage as I have described, cutting in numerous pieces the root-weeds, every bit of which grows; consequently, you would do as much mischief in one instance as good in another; but being turned up very rough in large clods, the sun bakes them, and completely kills the roots. It is ever absurd to reason against real experience; therefore, if a farmer tries the spring tillage, and finds, contrary to expectation, that it fills his lands with pernicious weeds instead of killing them, he certainly should desist. But I know from the experience of many persons, that such management as I have mentioned, has totally destroyed all seed-weeds, and proved no impediment to the destruction of root-ones, by successive tillage through the burning parts of the summer; not by leaving the roots in possession of large clods, but turning them up to the sun in earth so loote with tillage, that the harrows draw them out, and leave them so exposed, that death is the consequence. This is the case with the grasses which are among the worst. Docks, indeed, can be

no way destroyed, but by letting them grow, and then digging them up with spades, and carrying them clear away from the land.

Horse-hoed Corn.

Wheat, barley, oats, pease, beans, &c. that are drilled on ridges, with intervals left for horse-hoeing, must be well attended to through this month : The rows should be well hand-hoed, and weeded at the same time, by the men stooping down to pluck out such with their fingers, as they cannot get away with their hoes, without damage to the crop. One horse-hoeing should also be given this month, with the common swing-plough, turning a furrow from the plants, which consequently will throw up a small ridge in the middle of each interval : This kills all the weeds, and pulverizes the earth of the intervals, ready to throw it back by succeeding operations to the corn. In this horse-hoeing, the plow should go within four inches of the rows : If any corn is buried it must be uncovered by rakes. In horse-hoeing pease, great care must be taken, the trailing branches are not trodden or broken ; which should be prevented by banking up the rows, first with a hand-hoe, so as to make them incline inwards from the intervals.

Sheep.

I suppose your spring-food to have lasted till the 10th or 12th of May : Then they are to be turned into their summers grafs, in which you must observe to manage according to the nature of your flock. If your flock consists of lean-stock sheep, whose only profit is lamb and wool, except folding, then your business throughout the year, on whatever food, is to keep them in good and healthy order, but to take care not to fat them, for then you will plainly have too small a flock, and your profit accordingly suffer : These flocks are proper for

farms on poor soils, which require a large fold, and belonging to which are extensive commons, wastes or sheep-walks: such tracts will only keep the sheep, but never fatten one.

Another management in inclosed countries is to buy ewes in August or September, to turn them on to the fallows, or the poorest grass on a farm till Christmas, and then to begin to give them some turnips or cabbages, keeping them in good heart through the lambing, and afterwards as well as possible, that the lambs may be drawn fat by the butcher, soon enough to get the ewes fat, and gone by September or October. This is a very profitable practice, and pays the farmer extremely well; but it admits of very little folding, only through the winter on dry grass-land, and in the spring a little. Whether it might be ventured on in summer with fatting sheep, is a question not absolutely decided at present. This purchasing of ewes, to sell them and their lambs fat in the summer, extends from sheep a year old, to old ones, called in some parts *old cronies*.

A third system of conducting sheep, is, to buy in three year old wethers in the beginning of this month; to keep them rather bare till about three weeks after the hay is cleared; during all which time they are folded: Then to give them good keeping by degrees, and from it put them to turnips or cabbages, to fat. Contrive so, as not to sell till March; and keep many of them till the first week in May; during all which season, they sell better than at any time in the year. This is a most excellent sheep management; and will pay the farmer as well as any other; and, if his land is good, better than most. He may at the same time, carry on the ewe system, which are sold fat in autumn from grass; by which means he may convert his whole farm, if he pleases, profitably to the keeping and fatting of sheep.

Whatever the stock is, this is the time for turning them from winter to summer food; and you should take care that you have a sufficiency of clover or natural grasses for all your

stock.

stock. In the distribution of it, you should attend particularly to the distinction between those sorts of cattle that do well on clover, and such as require natural pastures. Sheep, hogs, young cattle, horses and cows that are suckled, are fed to more profit on clover, than in pastures. But fattening beasts, large working oxen, and cows that are milked, require natural grass. It is true, butter and cheese are in many places made from clover: But then we do not know whether the prices are not lower. If your clover is good, it will carry five, six, seven, or eight sheep an acre, or one horse; and on some lands even more. Good grass will carry a cow to an acre; but it must be above the common run. However, in proportioning the stock to the grass, take care to be rather under than over; because it is an easy matter to mow a few acres for hay, in case you have too much; but cattle cannot be sold half fat to advantage.

Folding Sheep.

This month begins the folding season throughout *England*; and the practice is of such importance, that it should be steadily pursued, in all places that abound with stock sheep. All lean sheep, and perhaps all fattening ones, should be folded; but the fold should be much larger than for the lean stock; and yet they will do as much good to the land, that is go over it as quick; for the benefit from fat beasts of all sorts to the land, both in dung and urine, much exceeds that from lean ones. In your folding you should observe one point, which is to manure the lands thoroughly. Many farmers give a very slight dressing; One night in a place, and the fold three square yards per sheep; instead of which it should be two nights, and only two square yards, or but one yard. In a word, the land should be left quite black, if arable; and with a pretty good covering, if grass. The proper arable lands to fold this month, are the cabbage and
turnip

turnip fallows: Those crops will be sown and planted in June, consequently will reap the benefit of the manure directly.

Hogs.

When the farm yards are cleared of cattle, the hogs should be sorted, and all those of a proper age for feeding on clover, should be drawn and turned into it: This is a part of farming that has of late been much expatiated on; but is not common husbandry in a fifth part of the kingdom. It well deserves to be considered, which is easy to do, as we have of late had pretty clear accounts of it.

In the old management of swine they were kept at home about the farm house or a close of grafs all summer, with times of regular feeding on wash, grains, or corn, but the error of such a conduct, was making no distinction between sows with pigs, or weaned pigs and large hogs. In the new method all the wash, &c. is reserved for the former, consequently a much larger stock can be kept, and the hogs half and three fourths grown, are turned into the clover about the middle of this month; and it is directed that the gates of the fields be lockt on them, and kept there till Michaelmas: but for this conduct the fences must be all in excellent repair, and a pond in the field for the hogs to drink at. This food agrees wonderfully with them: They grow very fast, and are taken out of the clover in admirable order for fatting. This practice must certainly be attended with very beneficial effects: Enabling the farmer to keep larger breeding flocks of hogs, is alone of much consequence, and cannot fail of greatly improving his profit; the large swine will pay for the clover as well as any other application of it, and the consequence of the whole system in raising large quantities of excellent manure, cannot be too strongly insisted on.

As the dairy will this month afford great plenty of butter-milk and cheese-whey, you should reserve all that is not
wanted

wanted for the present stock of fows and pigs in brick cisterns, so contrived, that it may run without loss directly from the dairy into them: This will be worth many pounds *per annum* in a farm of any size: Where such contrivancies are not used, the wash must all be used as fast as it is made, and whether wanted or not, which is a vastly greater loss than many persons, not used to the improved practice, will easily imagine. In those countries where the system of hogs is perfect, they form much the most considerable part of the Dairy's profit.

Horses.

The beginning of this month the farmer should leave off dry meat for his horses. Either turn them out to clover, or soil them in the stable on lucerne; and if he has not lucerne, on clover. This is one of the most important articles in his business: He should therefore consider it well, that he may adhere to that practice, which most reduces the expence of keeping the team, which in general is so great, as to eat up half the profit of a farm.

Food given in the stable goes much further than in the field; and also enables the farmer to raise large quantities of dung throughout the summer. These are both objects of great consequence; and if he appropriates a small field of lucerne near the stable to this use, he will find it by far the cheapest way of keeping his horses. An acre perfectly well managed in the drill way, and rich good land, and amply manured, will maintain four horses, from the latter end of April to the end of October: But, if a farmer would manage in the most judicious manner, he should allot an acre to every three horses; by which means he will be sure to have plenty to spare for any other use.

This system of conducting the team cannot be too strongly recommended: Those farmers who provide grass or clover to turn their horses into, know well the great quantity of land
that

that must be assigned them, and the high expences in general of keeping horses: They should determine to embrace all methods of lowering such great expences, and none offers more clearly, and with a greater certainty, than the cultivation of Lucerne for summer food.

Oxen.

Ox teams are maintained in winter at a much less expence than horses; but in summer they are nearer an equality; the same reasoning is therefore applicable to both. It is as advisable to soil oxen on lucerne as horses, they will thrive extremely well on it, and at a much less expence than pasturing them in the common manner.

Cows.

In this month, the cows should be kept in good food, that the dairy or the calves may return the farmer a due product. Clover and rye-grass that has been fed off early with sheep, will suit them well; but if the clover should, as it is commonly imagined to do, give the butter a taste, the variation of price should then be calculated on comparison with the convenience the farmer finds in feeding with that grass. Lucerne does excellently for cows, and gives the butter no ill taste: It will, mown and given in racks or cribs, go much further than any food, and at the same time yield an opportunity of raising much dung: a point that ought never to be forgotten. If this method is pursued, it will be most advisable to let the cows go in a small pasture of an acre or two, with a pond in it, and be baited on lucerne in the cow-house, or in cribs in a yard adjoining, three times a-day, with good care taken that the feeding places are kept well littered. In this manner the dairy or calves will not fail of proving extremely profitable. It is not at all necessary to assert, that the

cows

cows will yield as large a produce in this manner as when turned into natural grafs up to their horns: that is by no means the enquiry; but there cannot be a doubt of their yielding a much greater profit, which is the only point of consequence. In natural-grafs they will eat, spoil, and trample a great breadth; in exceeding good grafs, perhaps an acre a-head at least; but if your lucerne is good, one acre will feed three or four cows amply. Such a state of the case at once shews, that the product of the cows has nothing to do in the inquiry: It is the clear profit alone that should be considered.

In the feeding of horses, oxen, or cows, with lucerne, let me observe, that it should be regularly mown, every day, or every two days at most; and the best way of carrying it to the stable, will be in a small skeleton-cart drawn by one horse, and made for the purpose. In the cutting it, the plantation should be marked into thirty or fifteen divisions, one to be mown every day or every two days, and the cattle so proportioned, that they may eat it regularly. This will save trouble, and make the proportion between the cattle and their food to be discovered with the greater accuracy: The lucerne, if well managed, will be ready to cut every thirty days.

The Dairy.

Now begins the hurry of the dairy-maid's business: this is one of the most ticklish parts of the farmer's business, unless he has a very diligent and industrious wife, who sees minutely to her dairy, or a most honest, dilligent and careful house-keeper to do it for him, he will assuredly lose money by his dairy; trusted to common servants it will never pay charges. The dairy-maid must be up every morning by four o'clock, or she will be backward in her business. At six the cows must be milked, and there must be milkers enough to finish by seven. The same rule must be observed in the evening.

Cleanliness

Cleanliness is the great point in a dairy : the utensils should all be scalded every day ; the pails and whatever else are small enough, boiled in the copper daily, and vast quantities of cold water should be constantly poured down on the floor in hot weather, a cock of water running constantly through it: falling on the floor, and dashing a good deal about, would have excellent effects in cooling the air. There is scarcely any part of a farm that wants contrivance more than a dairy: if the number of cows be very great ; well-contrived conveniences would save half the expence of labour, and pay a farmer amply for erecting them himself.

Pare and Burn.

Paring and burning the turff is, in some places, begun so soon as March ; but it ought never to be done till April, and it is better still the beginning of May, at least the burning ; but the paring may be executed throughout March and April. In the burning, many hands should be set at work at once, that a dry time may be caught for it, in case the season in general proves wet. The ashes should only be spread before the plough, and turned in immediately : if they are long exposed to the air, they will lose much of their virtue. One peculiar circumstance attending the breaking up of grass-lands, whether old turff or sainfoine lays, in this manner, is the bringing them in order for turnips with only one plowing; and it is a general and very just observation, both in the North and West of England where this husbandry is most common, that turnips scarcely ever are known to fail on burnt-lands ; the fly, on such, is totally unknown. Now, any farmer must be sensible of the vast importance of thus bringing turff-land, by only one plowing to a turnip crop: an infinity of tillage is thus saved, as well as a great expence: and the turnips are always so great a crop, that they repay
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the expences of the operation with most ample profit. In a word, this husbandry deserves the warmest praise.

But of late years an opinion against it has prevailed much in some counties. Several of the nobility and gentry, of very large estates, have interdicted the practice, not allowing their tenants to pare and burn under any pretence whatever. The reason assigned for this conduct is, an apprehension that the depth of the soil decreases from it; that you burn the land, and reduce half an inch to half a line; a great evil, when the land is perhaps only three or four inches deep on a lime stone rock. But this reasoning many very sensible and experienced farmers know to be false. They, on the contrary, urge the universal circumstance of no land ever being paired till it has acquired a turf, which, with natural grasses, will be about twenty years; and with sainfoine the duration of the crop, which is from fifteen to twenty years: That it is not the soil which is burnt, but the bulbs of the plants, the roots, and net-work of grass roots; the earth, which is intermixed, is never burnt; it is calcined but never reduced to ashes, all of which arises from bulbs and roots; hence the fact, that the staple of the soil never suffers from paring or burning. If this reasoning be not true, whence the known fact, that soils, not four inches thick, and which have remained at the same thickness as long as the oldest man can remember, have yet been pared and burnt regularly every crop of sainfoine; that is five or six times in a century; and as the same husbandry is known by record to have been practised for ages on the same land, the staple must have lost three inches every hundred years; in other words, it must have been totally gone long ago, and nothing but rock remained: all which is evidently false, the soil at this day being as thick as ever. We may from hence conclude, what such farmers assert to be true, that the earth suffers no diminution, those roots and bulbs only being reduced to ashes, which in breaking up by the plough alone would rot quite away.

Bees.

Watch well your apiary, for you must now expect the bees to swarm. This most useful insect, is not so much attended to by many farmers as it ought: not a farm house should be without bee-hives; for the trouble they give is very trifling, and by farmers small profits should not be neglected: the union of them is not trifling.

Hemp.

This is the best season to sow hemp in. I suppose the land to have had its first tillage in October, left on the sharp ridge, and well water furrowed in the spring, to have been stirred twice or thrice, and well manured. The seed should be harrowed in, from two to four bushels per acre. This plant requires the very strongest richest land that can be fixed on; for, on poor soils, it yields no profitable return. I do not think it is a crop that is in general adviseable; a good farmer will make money by applying with as much spirit to more common articles, as he must to this, if he cultivates it at all.

Flax.

This is another culture that requires extreme rich land and great manuring. It answers pretty well with due attention; but I may remark on this crop what I did on hemp, that the same favourable circumstances of soil, manure, and weeding, would repay the farmer much better in other crops, such as cabbages, potatoes, carrots, &c. &c. with this general and great superiority: hemp and flax are very great exhausters, whereas the crops I propose, are undoubtedly beneficial to the soil, and vastly improving to a whole farm, in the quantity of dung they enable you to raise. Flax may be sown in April; but if you have not your land in excellent tilth, it is better deferred till May.

ARTICLE

ARTICLE XXXVII.

Of the culture of Clover.

[From DICKSON'S AGRICULTURE Vol. II.]

THE clover, though it is used for the same purposes as the ray-grass, is however a plant of a very different nature. The roots of the ray-grass spread themselves near the surface, the clover has a tap root, and penetrates the soil perpendicularly downwards. The roots of the ray-grass, by their number and smallness, bind the soil together, and render it firmer; the roots of the clover being large, in growing, open the soil, and render it more free. The roots of the ray-grass, though small, are so strong, as to pierce the hardest soil; whereas the roots of the clover, like all tap roots, though large, can pierce no soil, but what is free and open. These qualities of clover, direct us to the soil most proper for it, and that is one that is deep, free from quickening grass, dry and open.

A shallow soil may do for ray-grass, as the roots of this plant do not go deep: But a deep soil is necessary for clover, as its roots descend perpendicularly, and when they meet with *till*, or any kind of barren earth, by it they are resisted; and the plant, not receiving its proper nourishment, languishes and dies.

Land infested with quickening grass, may be sown very safely with rye grass seed, because ray-grass binds the surface, and soon forms a sward upon it, by which the quickening grass being prevented from vegetating, is destroyed; but clover, on the contrary, opening the soil, not only allows, but encourages this weed to extend its roots and propagate: So that land infested with it, is improper for clover. If the farmer sows land in this situation with clover, unless he allows it to lye till the natural sward destroys the quickening grass, he

he may expect to find it in much worse order when he breaks it up again.

Land, though stiff and in bad culture, yet, if it is naturally of a good quality, it will carry a good crop of ray-grass; for this plant is a good forrager, and searches every part of the soil for its food; but clover is a more tender plant, and cannot so easily search for its food. It pushes down one principal root, and, if the soil is stiff, this root is not allowed to grow large, and the horizontal roots that grow up from it are unable to extend themselves. The soil therefore upon which clover is to be sown, must either be free in its nature, or made so by proper culture.

Land is always driest in the surface; unless it is of a very spongy nature, the rain that falls sinks downwards, till it is resisted by a bed of till, clay, or some other hard substance that does not easily admit it, and there it lodges: Hence it happens sometimes, that land is very wet below, when tolerably dry above. On land of this kind, ray-grass may thrive very well, as it extends its roots near the surface, where the soil is in proper order: But clover does not succeed, as it pushes its roots far downward, and hence is chilled by the water that lodges below. These things would happen, supposing that the clover and ray-grass require the same proportion of water in their food, but it is probable, that the ray-grass requires the greatest proportion, and is therefore the better of that degree of wetness in the soil, that hurts and perhaps destroys clover.

There are several different kinds of clover used in Scotland, distinguished by the colour of their flowers; and called the red, the white, and the yellow. The flowers of the white and red are of the same form, but the flowers of the yellow resemble the flowers of the hop, and, on that account probably, is sometimes called hop clover. The red is the largest plant, has the strongest stalks and broadest leaves; and the white is the smallest. The yellow sometimes grows tall, but the stalk is small; this last is far from being so common as the other two.

There

There are kinds of clover, growing naturally in our fields, that have a great resemblance to these ; whether or no they are the same species is uncertain, though asserted by some writers on Agriculture. The natural red clover, has a very different leaf from the one that is sown. It is darker in the colour, much rougher in the skin, and sharper in the point. It appears too to be a perennial plant, and to spring every year from the root ; whereas it is well known that the other is not so, and that it cannot, by any kind of culture, be kept alive above 3 or 4 years, and even not so long, if it is allowed to bring its seed to perfection. These things seem to show, that these plants are not of the same kind. There is another thing that seems to confirm this, and which too is of importance to be attended to, in comparing plants with one another : The one kind is greedily eaten by cattle, while the other is seldom touched by them, except when compelled to it by hunger. This is the case with the kind that grows naturally, and as an evidence of the truth, it is often allowed to flower on pastures where the cattle have access to it, which it would not be allowed to do if the cattle were fond of it. The other two kinds that are cultivated have a nearer resemblance to those that grow naturally, and when sown in soils proper for them, are perennial plants, and probably would continue, were they not discouraged by the growth of other plants still more adapted to the soil and climate, and not so much hurt by pasturing.

Various are the seasons for sowing clover, and as various the ways of sowing it. Almost all the English authors that treat of this subject, recommend the autumn as the proper season. Some trials of this have been made in Scotland, but the greatest part of them, so far as I have been informed, have proved unsuccessful. The reasons given for preserving the autumn to the spring, are, that the land in the spring is cold and wet ; that if much rain follows, the seeds are liable to rot ; and, if drought follows, they will not vegetate. These things
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are very plausible; and yet clover sown properly in the spring seldom fails to come up if the seed is good. Sometimes indeed, when it is sown along with corn, the crop fails by the corn lodging; but very seldom from the badness of the season. And indeed it is natural to expect, that clover-seed will come up very well, provided the farmer is attentive to take the time when the season is good, and his land in a proper situation. While the land is very cold and wet, it ought not indeed to be sown, but it is in this situation only in the beginning of the spring; and continued rains to soak the whole lands with water, after the spring is advanced, are not to be expected; otherways we need not prepare for sowing seed of any kind.

When clover-seed is sown late in the spring, sometimes indeed the drought is so great, as to prevent it from coming up immediately: but there is no danger from this. The first plentiful shower brings it away, and there is no danger of its being destroyed, though drought should succeed this shower, if corn is sown along with it; for the corn growing upon the field keeps out the drought, and preserves the sap. The effect is different when the seed is sown in the autumn by itself. In the autumn it is to be supposed that the land is dry, and being heated by the sun, whenever a plentiful shower comes, every seed that has its proper proportion of air, vegetates, but after this shower, possibly a drought sets in, which is not uncommon; this drought affects the surface, and penetrates deeper than the roots of the young seedling have been able to reach; these young plants therefore, thus deprived of their nourishment, are in danger of being destroyed.

But in a matter of this kind, it is vain to argue: Experience must be our guide. If it is found from experience, that clover sown in the autumn succeeds better in England, than what is sown in the spring; then, without insisting upon the cause

cause of this, one may safely assert, that that season is the best for that climate.

As there are different seasons for sowing clover proposed, so there are different methods of sowing likewise proposed. The ordinary way both in Scotland and England, is to sow it with wheat, or with oats or barley in the spring. The sowing with flax, it is said, is a very good way. Flax is not so apt to lodge as corn, and the weeding and pulling is of some benefit to the clover. This method of sowing clover with other seed is greatly condemned by some authors, who call the farmers stupid and obstinate, for continuing it when it succeeds so ill. They go so far as to assert, that it is impossible for land to nourish two crops at the same time. That the sowing the clover by itself may be the better way, is very probable, but it is not the proper method to engage the farmer to follow it, to tell him that it is not possible for him to have a crop in the other way, and to call him ignorant and obstinate, because he still persists. For, sensible that he has often had a good crop of clover, though sown with a crop of corn, he will not allow himself to be persuaded to alter his practice by any reasoning of the man who positively asserts things contrary to his experience.

But though the farmer has frequently a good crop of clover, though sown with oats or barley, yet it is certain, that the corn often hurts the clover, and that the clover sometimes hurts the corn. If these injuries could be exactly calculated, it would probably appear that they exceed all the value of the crop of corn, with which the grass-seeds are sown. Were we in every case more certain of a crop after clover is sown by itself, I could not hesitate a moment to recommend it as the most proper way. It has certainly some peculiar advantages. We are more certain of having a proper season for sowing. When the clover is sown along with corn, we are in some measure confined, for the clover must be sown within a certain time after the corn is sown. This confinement

ment is very great, particularly when the clover-feed is sown with barley: for, from the beginning of the plowing, to the last of the harrowing of a large barley-field, so much time elapses, that land, which may be in very good order for sowing the clover at the beginning of the plowing, may be in bad order before the harrowing is finished. Besides, the nature of the season for the barley-feed requires, that the land be sown and harrowed as soon as possible after it is plowed; and hence if the field is large, it may be some days after the barley begins to be sown upon it before it is ended; and if the sowing of the clover is delayed till the whole is finished, as is commonly done, one part of the field must be in a situation somewhat different from another. But when the clover-feed is sown by itself, the field may be plowed in a proper condition for plowing, and then may lye waiting for a proper season for being sown.

There is another obvious advantage that attends the sowing of clover by itself, and that is, the land, carrying no crop of corn, must be in a better condition for nourishing the clover in the second year; and we may also suppose, that it will be in a better condition when brought again into tillage. The weeds that come up along with the clover, would indeed do much harm if allowed to stand and sow their seed; but if they are cut down, as can be easily done sometime early in summer, this will be prevented, and both the crop and the land be in a better situation, than if they had been allowed to stand till harvest, as is done when the clover is sown along with corn.

But though the sowing clover by itself has these advantages, yet I am not certain, but the sowing it along with a crop of corn, may in some situations be preferable. It is an objection to the sowing clover in the spring, that if it is late in the season and drought follows, it will not come up; or if by a shower it should begin to vegetate, it may be caught in that situation by the drought, and destroyed. When clover is
sown

sown by itself upon land that is clean, there is some danger of this; but when it is sown with corn, there is no danger. I already observed, that whenever a plentiful shower comes, the seed springs, and the growing corn prevents the drought from penetrating, and preserves the sap; whereas, if there was no crop on the ground, the drought might penetrate again so soon as to stop the vegetation after it is begun.

I do not chuse therefore, to give the preference to any of the ways of sowing this seed above the other, but leave it to the judgement of the farmer: for whatever may be my opinion, yet I am certain it will be more useful, to give some directions about sowing it in the ordinary way, than to endeavour to explode it, and establish the other. For nothing can be said so convincing, as to cure the farmers of what these authors call covetousness, of sowing their grass seeds along with a crop of corn: a covetousness not to be condemned, if the grass seeds are not greatly hurt by it.

As the lodging of corn destroys all plants that are below, it is necessary when clover is to be sown, to sow the corn in such a manner as to prevent this. It has already been observed, that when there are few plants, the corn is not so apt to lodge as when there are many, though the number of stalks should be equal. When the plants are few, there is more air below, and this hardens the surface; and is likewise useful to the young plants of grass. But when land is much infested with weeds, the sowing thin does not serve this purpose; for though there may be few plants of corn, yet every vacancy is filled up with weeds, and the air is as effectually shut out, as if the plants of corn stood ever so thick. To secure therefore the advantage of thin sowing, the land must be made very clean*. The farmer can always know, whether or no his land is in this situation. However, it is pro-

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* See No. II. p. 60 of this volume.

per that he look a little forward, and plan his scheme of management in such a manner, that when his land is naturally much infested with weeds, the clover may be sown soon after the fallow, or even with the crop that is sown upon it. This is the most effectual means to prevent the clover from being hurt by the corn, and this is what ought chiefly to be attended to; for when a crop of clover is destroyed, the scheme of management which the farmer proposed to carry on, perhaps for a number of years, is thereby overturned.

But as the clover is in danger of being hurt by the corn, so the corn is likewise in danger of being hurt by the clover. Sometimes, in a wet season, the clover gets a top of the corn, and destroys the crop. This seldom happens when the clover is sown with barley or wheat, for it is much later in the season when sown with barley, than when sown with oats, and therefore is not so far advanced at harvest; and the wheat is so far advanced before the clover seed is sown, and grows so tall, that the clover can never get above it. As a means then to prevent the clover from hurting the corn, it may be sown early in the season upon wheat, or late in the season with barley. I mentioned a kind of barley called thanet, which, from the strength of its roots and stalk, is not so apt to lodge as the common barley; this is the most proper barley for the clover to be sown with.

But as all kinds of barley are more apt to lodge than oats, as the season of sowing oats is more proper for sowing clover, than the season of sowing barley, the farmer should sow the clover with the oats, when equally convenient. Though the crop of corn is more certain, when the clover is sown with the barley; yet the crop of clover is more certain when it is sown with the oats, and the clover is what the farmer, generally speaking, has chiefly in view. When the crop of oats is observed to be in danger from the clover, as sometimes it is, the farmer may take them in time, and turn the whole
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into a crop of hay, which may probably be as valuable as the crop of oats, while it is less hurtful to the land.

The sowing clover among a wheat crop is not so common as sowing it with barley or oats. When land is in bad order, and needs to be fallowed, the farmer sometimes sows wheat immediately before the fallow; but upon land in this situation, it cannot be expected that clover will succeed, and it is therefore seldom or never sown. A crop of grass is not as yet generally thought of so great value, as to engage the farmer to sow grass seeds with the fallow crop, and hence it seldom happens that clover seed is sown amongst wheat. This, however, has been tried, and it succeeds very well when the land is in proper order.

When clover is sown with barley or oats, after these grains are sown, and the land harrowed, the clover seed is sown, and after this the land is again harrowed or rolled. When clover is sown with a crop of wheat, this is done in the spring, and after it the wheat is rolled. It is the common way to sow the clover seed without any preparation given to the land; but it is a better way to harrow the land before the clover is sown. This makes the roller cover the seed more effectually, and the harrowing does no harm to the wheat. If any weak plants are destroyed by it, this loss is more than ballanced by the destruction of the weeds, and the opening of the surface to admit the air; both which advantages are produced by the harrowing.

Clover seed may be sown in the same manner amongst oats or early sown barley, and the same method may be observed. Some time after the corn has come up, the land may be harrowed, and the clover seed sown. If the weather is dry, the different parts of the operation should succeed each other as quickly as possible. The harrows should be followed immediately by the sower, and the sower by the roller, that so the drought may not be allowed to penetrate deep, which it is apt to do if the land is not soon rolled after it is harrowed.

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When the season is far advanced, this becomes the more necessary, as the drought commonly becomes the more violent.

It cannot be positively asserted, that harrowing does no hurt to barley or oats, after they have been above ground for some time. It is certainly in greater danger of doing hurt to these crops than to wheat. The wheat land in the spring is firmer than either the oat or barley land; and the wheat plants having had longer time to grow, have their roots further extended; so that an operation that does no harm to wheat, may possibly be hurtful to barley or oats. However, it is not probable that harrowing once over will prove hurtful; this operation has been frequently tried for another purpose, and it has always been found to do more good to the crop by the destruction of weeds, than hurt by the destruction of any of the plants of corn. It is probable therefore, that it may be used without great risk to prepare the land for being sown with clover, not only amongst wheat, but also amongst oats or barley.

There is nothing that the English authors on husbandry differ more about, than the quantity of clover-seed proper to be sown upon an acre. The authors of the Complete Body of Husbandry, fix it between 8 and 10 lb. and are positive, that less than 8 is too little, and more than 10 too much. The author of the New system of Agriculture insists for 20, and asserts, that if the farmers were not the most ignorant and obstinate of all men, they would be convinced that no less quantity is sufficient. Without paying any regard to what is asserted by these positive gentlemen, I shall only observe, that the farmers in Scotland, who sow clover with oats or barley, find, that from 10 to 16 lb. of red, or from 12 to 18 lb. of white on the acre, produces a very good crop.

Clover, like ray-grass, is sometimes sown for hay, sometimes for pasture, and sometimes for both. The red clover is the most proper for hay, the white for pasture, and when both are intended, a mixture of the two kinds is most proper.

When

When red clover is sown without a mixture of any other kind, the farmer must have it in his view, to bring his land into tillage again in two or three year. For, after the second year, the crop of this kind of clover is of very little value.

When white clover is sown by itself, the farmer must not expect a crop of hay, for this kind of clover seldom rises to such a height as to produce a good crop; but then he may lay his account to keep the field long in pasture, for this kind of clover continues till wore out by the kind of grafs that is more natural to the soil.

When a mixture of those two kinds of clover are sown, some crops of hay may be taken, and then the land may be allowed to lye some years longer for pasture. The red clover affords the crops of hay, and the white remains till the natural grafs arises. In this case, there is commonly sown upon the acre from 8 to 12 lb. of red clover, and from 6 to 8 of white*.

In the climate of Scotland, seldom more than one crop of hay in the season succeeds. The second crop is commonly so late, that it is very difficult and troublesome to get the hay properly made. It may be pastured or cut green for cattle. The first method is reckoned the best, as thereby less hurt is done to the land.

In some parts of England, the second crop of clover in the season is allowed commonly to stand for seed. This may possibly turn out to very good account. There are few places in Scotland in which the second crop of clover will bring the seed to perfection; and I would by no means advise the farmer to let the first crop stand for this purpose. The crop, when allowed to stand for seed, may perhaps be much more valuable than when it is cut for hay, but that practice would hurt

* These proportions are varied according to the judgment of the farmer.

hurt the land, and prevent the sowing of clover from being such an improvement, as it is under the present management.

When clover is cut green for cattle, it is a proper way to feed them with it upon a field that needs to be dunged. This is better than feeding them in stalls; it saves the expence of carrying out the dung, and secures the greatest benefit from the urine, which is a very rich manure.

Before this article is concluded, it is necessary to observe, that red clover, while green, is dangerous to black cattle and sheep when given them at first, especially if wet with dew or rain. When it is intended therefore, that such cattle should be fed upon it, whether it is to be cut for them, or they put upon it to pasture, they must be allowed it only sparingly at first, and brought to it by degrees. After being accustomed to it for a few days, the danger is over, and they may be allowed as much of it as they can take.

Of Clover mixed with Ray-grass.

When the farmer needs green forage for his cattle, red clover is the most proper for this. An acre of good red clover maintains more cattle than three or four acres of common grass, but then it is not so proper for hay. Clover-hay is very troublesome in making, and it is not reckoned so good for feeding as some other kinds of hay; and while the clover has these disadvantages in itself; it also hurts the land on which it grows in this respect, that it greatly encourages the propagation of the quickening grass, that weed by which almost all our lands in Scotland are infested. To remedy these things, it is a custom to sow rye-grass along with it. Clover, when mixed with ray-grass, is easier made into hay, and the hay itself is much better, and the ray grass covering the surface, prevents the growth of the quickening grass. It is true, that by this the ray-grass likewise discourages the growth of the clover, but this is not reckoned a great disadvantage. The
clover

clover meets with little or no interruption in the first season, and though it decreases more in the second than it would have done had it been sown by itself, yet the crop of hay is nothing the less, as the increase of the ray grafs is in proportion to the decrease of the clover. The quantity sown upon the acre in this way, is from 8 to 12 lb. of clover, and from 1 to 3 firlots of ray-grafs.

It was observed in the last section, that when it is proposed that a field shall carry some crops of hay, and then ly some years more in pasture, it is common to sow a mixture of red and white clover. The adding a proportion of ray-grafs to this is reckoned an improvement. This improves the hay, as has already been observed, and it renders the pasture grafs better during the winter, and more early in the spring. The quantity sown upon an acre in this way, is commonly from 6 to 10 lb. of red clover, from 4 to 6 lb. of white clover, and from 1 to 3 firlots of ray-grafs.

ARTICLE XXXVIII.

Of the Impropriety of Tenants inclosing on a short Lease, and of laying improved ground not inclosed into Pasture—A Scheme of Crops, by which it is proposed to feed the Cattle on Cut Grafs only.

[In a Letter to the PUBLISHER.]

SIR,

THE favourable reception you gave my last letter, encourages me again to offer you this; in hopes it may be of some service to my neighbours, the farmers in Teviotdale and the Merse, for whom it is principally designed.

IF a tenant is possessed of an arable farm, and casts about, how to turn it to the greatest benefit, there is nothing in the whole

whole circle of farming, that will be more advantageous to him, or indeed that he will, by skilled farmers, be more readily advised to, than to study such a scheme of management, as will, in its courses, bring him the soonest into good crops of grass. These are not only very profitable in themselves; but besides, he is thereby enabled to carry on all his other business with ease and profit, which, without them, he cannot propose to do.

With this view, tenants have been strongly advised to inclose their farms; for without substantial fences, he can never turn his grass-grounds to any account.

The preference of land inclosed, beyond what is open and uninclosed, are very properly set forth in a letter from your correspondent A. T. (Vol. I. Art. xxxiii. p. 242). But that gentleman, being very sensible, that few tenants can afford to lay out the expence upon a short lease, he proposes an encouragement for them to do it, by having the present value of the fences, paid to them by the proprietor at the end of the lease. I beg leave however to doubt, if that will be an effectual encouragement: For even, where the proprietor himself bears the expence of making the fences, if they are made with hedge and ditch, upon a lease of 21 years, which is the common term of leases in this part of the country, the tenant can reap very little advantage from them. For the trouble and expence of cleaning, clipping, railing, &c. &c. that attend them for many years after they are made, are so very considerable, that from the time they become sensible, so little of the lease will remain, that he will not have time to be refunded of the great expence he must necessarily be out of pocket. In some grounds and situations, the hedges may become sensible in 8 or 10 years; But in general, with the greatest attention bestowed upon them, it will be 14 or 16 years before they can arrive to that perfection; and by that time, the tenant must begin to prepare for cropping his land

in such a manner as will turn out most for his own advantage.

On the other hand, if the ground is not inclosed, and is of rich and improved quality, the laying such ground into grass for pasture, is attended with unspeakable loss. In a wet season, the ground is greatly poached by the cattle; and they do not feed to purpose, when that is the case. All the corn-grounds that ly next to the pasture-field, is more spoiled, than most peope are aware of; a strong instance of which I myself experienced this very year; I had a field of wheat on the outside of my farm, where a neighbour of mine took the liberty of start and o'er-loup, as it is called, without allowing of which there is no living in good neighbourhood: When the wheat was cut, as the crop was but thin, the damage did not appear considerable; and I overlooked the trespass. But having occasion to thrash out some for seed, I took 19 threaves, the produce of two acres that lay next the pasture, from which I expected 9 and a half Berwick bolls; but to my great surprize and disappointment, I had no more than 4 bolls and a shiot. If every person would keep his corn, that grows next to his neighbour's pasture, or where the fences are in bad repair, separate from the rest of the field, they would generally find the one-half deficient, even although the stools stand as thick, and there be no apparent defect while the corn is on the ground. It would be better for them to save a few acres of grass round the corn, than allow either their own or their neighbour's cattle to come near the sides of the corn: for some of them will most readily break in amongst it; the herd and his dog are employed to turn them out without any precaution; and the cattle are thereby forced farther in amongst the corn, and probably will traverse the whole before they can be turned; and this frequently when the corn is in the ear, when the loss will be little less than I sustained: for corn being once trodden down, though it may recover a little, yet being once broke, it never fills.

From these things I am apt to conclude, that it can be of little or no advantage for tenants to inclose their land with ditch and hedge upon a lease of 21 years; and that to lay improved land that is in good order into grafs for pasture must be equally unprofitable.

I therefore come now to the point I had in view, namely, to shew in what manner, an arable farm may be managed to the best advantage, without either inclosing or pasturing: And that, in my humble opinion, may be effectuated by one simple proposition, to wit, the keeping all the cattle at cut-grafs or hay.

I shall suppose the farm to be partly inclined to wet, and partly dry: The first thing to be done will be, to sow a good part of what is in the best order with clover and rye-grafs: and to get the outfield thoroughly limed as fast as possible. After this, let the whole farm, which I shall suppose to consist of 300 acres, be divided into twelve equal parts, or as near equal as the lying of the ground will permit. Suppose them equal of 25 acres each. Of the six divisions of the dry part of the farm, one should be dunged every year for turnips; and the course of crops will be as follows:

1 Turnip	-	-	-	-	25 acres
2 Barley	-	-	-	-	25
3 Oats sown with Clover and Rye-grafs					25
4 Clover and Rye-grafs	-	-	-	-	25
5 Ditto	-	-	-	-	25
6 Oats	-	-	-	-	25
					150

Of the other six divisions, one should be fallowed and dunged

ed every year for wheat, on which the course of crops will be thus,

1 Fallow	-	-	-	-	-	25 acres
2 Wheat	-	-	-	-	-	25
3 Pease or Beans	-	-	-	-	-	25
4 Barley sown with clover only	-	-	-	-	-	25
5 Clover	-	-	-	-	-	25
6 Oats	-	-	-	-	-	25
						150 acres

By this means, the crop every year will stand thus,

25 acres of	-	-	-	Turnip
25	-	-	-	Fallow
25	-	-	-	Wheat
25	-	-	-	Pease or Beans
50	-	-	-	Barley
75	-	-	-	Oats
75	-	-	-	Grass

300 acres

According to this course of management, there will be a great deal in tillage; but it is pretty evident, that there cannot be so much made of the land in any other way, providing it is kept in good order: And if it is dunged every six years, and cropped in the way proposed, it will be always in good condition: the clover crops will contribute to improve it greatly: for as the clover roots go deep, they not only receive the vegetable food that lies below the reach of the other crops; but they prepare and enrich the ground for the roots of the succeeding crops.

Some

Some I know will object and say, that there cannot be dung sufficient in such a farm to go over 50 acres every year, viz. the fallow and turnip land: But I maintain, that if a good stock of cattle is kept, to the number of fifty, young and old, at cut grass during the summer, and upon the turnips and the hay and straw of the farm during the winter; and considering the great quantity of straw to be employed for litter during the whole year, that a sufficient quantity of litter will be raised to answer all the purposes intended.

I earnestly recommend shades or yards for keeping and feeding the cattle during the summer season; for houses keep them by far too warm: And if they are properly fed, by giving them the grass fresh cut from the field, they will thrive amazingly better than in most of the common pastures: Twenty five acres of the grass, if tolerably good, will serve the cattle for cutting through the whole summer; and feed as many and better than the whole seventy five acres in pasture. Thus there will be fifty acres reserved for hay. But if a severe drought should set in, as did last summer, so as to prevent the grass from rising properly, so as to be fit for cutting, the cattle in that case may then be turned out to pasture it; as there will not be any of the disadvantages attending the pasturing this fresh good grass, where the cattle are soon filled, and lye down, without ranging over a great extent of ground.

I must caution your readers, that this scheme is intended principally for my brethren farmers in Merie and Teviotdale; for in the Lothians their soil and climate is very different from ours, and a different succession of crops may be better adapted to them: Besides, in that country many of the farmers despise lime, and would not use it, though it were to be found within their own bounds; while we think, that nothing can be done without it.

Near Kelso,

28th December 1773.

R. G.

A R T I.

ARTICLE XXXIX.

*Approbation of Extracts from the FARMERS KALENDAR—
Extracts from YOUNG's Experimental Agriculture.*

[In a Letter to the PUBLISHER.]

TO the benevolent heart much pleasure will be afforded, by considering the progress now making in the knowledge and practice of Farming; and surely, if praise is due to Man, He is entitled to a portion of it, who opens his mind for the benefit of society, and spreads his experimental knowledge before the Public.

TO ARTHUR YOUNG Esq; how greatly are our King and Country indebted? His labours are truly useful: And although, in such voluminous publications, and such an immense number of rural calculations, inaccuracies will be found; yet, upon the whole, they are more correct than could have been expected. I have read most of his books, always with delight, and never without advantage. His FARMERS KALENDAR is a most excellent performance: Accept of my thanks, and the thanks of many of your correspondents from this quarter, for inserting it in the SCOTS FARMER; and we beg, you would continue doing so: And although my brother Farmer PHILAGROS and his friend can have nothing to learn from it, and may be deeper skilled in the noble art than YOUNG himself; yet RUSTICUS intreats, they would not be angry at the publication being continued, as he, with many others, will be the wiser for it.

With your valuable correspondent TITYRUS, I wish also, that you would make extracts from the experimental Agriculture. Below, you have a few that I took upon the first publication of the book, as I had then the advantage of perusing it. I have found them to be right, and the practice is what I myself have adopted.

W H E A T.

W H E A T.

From a variety of experiments it appears, that the most profitable quantity of wheat for seed, to an English acre of ground, is two bushels and an half ; and that the best time for sowing, is from the eight of September, to the twenty fourth of November. N. B. Land supposed clean and rich.

B A R L E Y.

From a variety of experiments it appears, that the most profitable quantity of Barley for seed, to an English acre, is three bushels, upon land fallowed and manured ; and five bushels the most advantageous quantity upon common lands. The most beneficial time of sowing is in February and March ; and, allowing a month later for our Northern situations, that is equal to our March and April.

The average product from sowing in

February	-	is	-	-	12 $\frac{1}{2}$
March	-	-	-	-	11 $\frac{1}{2}$
April	-	-	-	-	8 $\frac{1}{2}$
May	-	-	-	-	6
June	.	-	-	-	3 $\frac{1}{2}$

But here I must observe, that no farmer should sow his land so early, unless it is quite free from weeds, which cannot be the case, except upon land well fallowed, or after hoed crops thoroughly cleaned. In that case, I will vouch, that the sowing in March is a surer time to have a good crop than the latter months. My barley seed is always finished, if the weather will allow, in the month of March, or first week of April: I never choose to be later : By this way I run less risk of suffering from drought ; because so early in the season, there is never a want of sap, to make the seed spring ; and before the droughts

drougths in June and July set in, the corn has so covered the soil, as, by its shade, to keep the soil moist and cool. The barley I sow, is that propagated by Sir GEORGE SUTTIE, of the Lincoln kind, but exceeding, in beauty and weight, any barley I ever saw brought from England. And here let me make my acknowledgements to that Gentleman, for the real improvements in Agriculture he has introduced. This fine barley is entirely his own. And to him also we are indebted for the bean husbandry, which I have the satisfaction of seeing, through the channel of the SCOTS FARMER, so universally adopted, to the certain benefit of the farmer, and of course to the landlord.

O A T S.

The quantity of seed oats most proper for an English acre, is from seven to seven and an half bushels; and the most proper time for sowing, is the end of February or beginning of March, answering to our March or April.

P E A S E.

The quantity of pease for seed proper for an English acre, is from four bushels and an half to five and an half.

N. B. The bushel meant is the Winchester, nearly equal to the Linlithgow wheat firlo.

C L O V E R.

As this is the season for sowing red clover, it will not be improper to mention, how to know the seed when good.

In the red clover, there are three sorts of seeds; purple, white or green, and reddish. The purple is the true ripe seed; the white or green is the unripe; and the reddish sort is that which is burnt and spoilt, after it has been got from whence,
where

where the seed abounds with the purple fort, it is the most valuable.

MR PRINTER, my turning a writer on Agriculture, is surely a reproach to many in my neighbourhood ; I am in farming, but a man of a day's date, to many around me, whose heads are hoary in the practice of the noble science : But why are they silent ? It is wrong : It is unjust. Man was never made for himself : The fulfilling of the law of GOD is, Love, first to GOD as the gracious and bountiful giver of all Good ; and next, to each other. Consider then, my Friends, that you are not at liberty to keep your knowledge to yourselves : You are in debt to your species, and to your Country. Haste then to pay it, before the end come, and death put a period to all your future purposes of amendment.

*East Lothian,
May 6th, 1774.*

RUSTICUS.

ARTI.

ARTICLE XL.

*An ESSAY on the MANAGEMENT of HOGS; including
Experiments on Rearing and Fattening them:*

By ARTHUR YOUNG Esq

Part of a Resolution of the Society for the Encouragement of Arts, Manufactures and Commerce.

— “That Mr YOUNG be desired to publish his account of rearing
“and fattening Hogs, with such additions and remarks as he shall
“think proper.”

P R E F A C E.

IT was my constant custom, during five years that I farmed in *Suffolk*, (and has been so since) to register, in a regular manner, all the experiments I made,—and, from the attention I gave to such matters, every common crop I raised became experimental; and all the ordinary management of the business I found as susceptible of minute calculation, as the trials I purposely made. This attentive method of conducting a farm, which can only be executed by a person who lives in what may be called absolute obscurity, enabled me to register near two thousand original experiments, upon a vast variety of subjects.

Among others, Hogs demanded particular attention; and will, in all farms properly conducted, form a principal branch of rural œconomy. I made numerous trials on feeding and fattening them, and with many articles of food not commonly used.

The Society for the Encouragement of Arts, Manufactures, and Commerce, offered a premium of twenty pounds, or a gold medal, for the best account of rearing and fattening them. In consequence of that offer, I sent them a series of trials, as a candidate for their medal, and have been honoured with it.

The account I sent was incorrectly and surreptitiously published, which renders a perfect edition of it highly necessary; not only to my own reputation, but in defence of their adjudication of the premium. It is now, by their desire, presented to the public, with the addition of such general observations as are necessary to elucidate the experiments.

These trials are few, in comparison to the number I made and registered; but a certain brevity, I apprehend, is requisite in essays that are to be read at a public meeting: this induced me to lay before the Society but a part of what I tried; a circumstance that should apologize for the many Imperfections to be found in this sketch.

Of the Management of HOGS.

THE importance of this animal to the farmer is not sufficiently known in every part of *England*: There are many dairies that do not maintain one tenth of the swine they might, with proper management—Several garden roots are raised in large quantities, without being applied to feeding hogs;—and clover is cultivated, in many counties, upon the largest scale, without its utility for the same use being the least known. No person, who has tried many experiments in this part of rural œconomics, can fail regretting that so many farmers should neglect a conduct that adds so much to the good of the public, as well as to their own profit.

There are two principal objects in the rearing and fattening hogs; *first*, to make the greatest advantage of a dairy; and, *secondly*, to substitute some other food in the place of that which arises from cows, when none are kept.

It is the practice of several counties to use the skim-milk, butter-milk, and cheese-whey, in *fattening* hogs. This is a pernicious custom; that food, for such a use, it is every where known, has twenty substitutes, viz. pease, beans, buck-wheat,

wheat, barley, &c. &c. &c.; but it is not so generally known, that pigs may be *reared* without cows. It is agreed, that the dairy food is excellent for the latter purpose.

For this reason, I shall venture to propose a different conduct, and with the greater readiness, as I have found it, by experience, to be more profitable than the common management. The dairy, upon this improved system, should be applied only to rearing pigs, and feeding sows which have young. But this, at once, opens a larger prospect of the whole management of a farm.

The sows and weaned pigs should evidently be proportioned, in such a manner to the number of cows in milk, as to consume all the dairy food without waste. And other sorts of food provided for the keeping sows that have no pigs—hogs half—three-fourths—full grown—and fattening ones.

The practice of some counties, as well as the annexed experiments, prove that clover is a most capital object in *keeping* all these sorts of swine; but those writers, who assert that it will completely fatten them, go much too far. There is no sort of cattle in a farm that require more attention than hogs; any method, therefore, that simplifies the management, must be peculiarly valuable.

Hogs that are a quarter (or upwards) grown, may be absolutely confined to a clover field, until it is necessary to sow wheat: nine tenths of *Britain* will doubt this fact, but I have repeatedly experienced the truth of it. The fences, it is unnecessary to add, must, in this system, be incomparably good;—which necessity, I apprehend, is a particular merit in a mode of husbandry; for a conduct that forces the farmer to have excellent fences, is, so far, of great utility. It is also requisite to add, that there must be a pond in the field, which never fails. In a good crop of clover, well fenced and watered, swine of this sort may be locked up from the Middle of May to Michaelmas; and no consumption of the clover will pay the farmer better: I shall add an experiment or two to prove
this

this assertion ; I could insert many, but a certain brevity is requisite in such slight essays as these.

I have found lucerne to be equal, and in some years superior to clover, for this use.—Sainfoine is also of excellent utility ; but ray grass and burnet, will not by any means do. Natural pastures, with wash, are a good substitute ; but never will be found to equal the artificial grasses.

But in making the greatest advantage of a dairy, we must not confine ourselves to the summer-keeping alone ; provision must be made for winter-feeding such hogs as do not require assistance from the dairy.

The following experiments will prove, that carrots, parsnips, beets, and potatoes, are of admirable use in feeding pigs that have been reared ;—they will keep the hogs that are taken out of the clover in excellent order, and even fatten them—and maintain, to vast advantage, sows that have no pigs.

By this general system of management it appears, that hogs are to be maintained the year through upon clover and these roots—and recourse had to the dairy only for assistance in feeding sows that have pigs, and in rearing their young.

It must be extremely evident, that with this conduct, the number of swine maintained on a dairy farm may be prodigious—the number of cows point out the number of sows and pigs ; and these again must proportion the number of acres applied to the production of clover and roots. Thus the whole chain of crops is connected, and each field the support of the other.

The *second* object, in the management of swine, is the substituting some food in the room of a dairy, for rearing pigs ; upon such farms as keep no cows, this is an object of very great importance, as there are numerous extensive tracts of country that will produce clover in very great perfection, and also many sorts of roots, but where it is either unprofitable to keep cows—or only advantageous to suckle them.

The reason I before gave, viz. keeping this sketch in due bounds

bounds, prevents the insertion of numerous experiments, which I formed for the particular determination of this point: I found from repeated trials, that carrots and parsnips will wean pigs of a proper age, almost as well as milk;—that is, in such a degree of perfection, as to render the keeping a large number of hogs, upon that dependance, extremely advisable to any farmer, whose business or situation may prompt him to do it; and other experiments assured me, that sows, with the most numerous litters, may be maintained to great profit in the same manner. Potatoes, and red beets, I likewise found of very great use for the same purpose.

It may not be improper here, to consider the consequence of enabling the farmer to keep large stocks of swine, by means of roots, so extremely productive as those I have mentioned: there are no soils, but what, with proper management, will yield some or other of them; and the crops are immense.—The number of swine to be fattened or fed by an acre of carrots or potatoes, would surprise those who have never formed any experiments upon the point: and the excellency of the husbandry, in general, should plead powerfully with our farmers to adopt it upon this principle. These roots are all fallow crops, that is, they are of the same advantage to the soil as a year of fallow—and, if cultivated in the manner they ought to be, much superior to any fallow; for this reason, their culture is beneficial to the land, and a very material method of bringing it into excellent heart. Their application to feeding swine is, alone, sufficient to improve a farm that is almost worn out, since it cannot be conducted without raising large quantities of the very best dung.

Now, the consequences of adopting the culture of vegetables, that clean and ameliorate the soil—and in their use infinitely enrich it, must be obvious to every reader. It is no exaggeration to assert, that the best soils may be improved, and the poorest converted into good ones by this conduct;—and I can assert, on experiment, cheaper than by any other method. I
have

have found, that 90 hogs will, in fattening, yield as much manure as is worth thirty pounds on the spot—and where straw, stubble, or fern are to be had very cheap, to a much greater amount.

It is from these several considerations, that I apprehend the following experiments may be of real utility to those who have dairies;—to those who keep cows, but apply them to suckling;—to those who have no cows, but are willing to keep swine: and, lastly, to those, who, on any soils, are desirous of improving them.

EXPERIMENT I.

THE first week in March, 1765, thirty pigs, just weaned, were drawn from forty-three, that they might be all of a size; they were then distributed into five lots, equally divided; I do not think there was half a crown difference in the value of them; and then fed with distinct sorts of meat. Each five had a sty to themselves, and all were kept clean, and equally littered with straw.

- Lot No 1. Was fed with pollard mixt with water.
 2. With pollard, mixt with skim milk.
 3. With boiled turnips, and pollard mixt with the turnip liquor.
 4. With boiled potatoes and water.
 5. With skim milk.

They were kept with this food thirty days. I then turned them out of their styes (none had died), and viewed them with a person particularly skilled in hogs; the result was,

- No 2. The best,—pollard and skim milk
 5. Next best,—skim milk.
 1. Next,—pollard and water.
 3 and 4.—Equal.

It appears from hence, that pollard and milk are the best food;

food; milk alone, very good. The other articles advantageous (for none of the pigs were in bad order), though not equal to the former.

EXPERIMENT II.

At the same time with the preceeding trial, four lots of pigs, that had been weaned three months, were equally drawn from my farm yard, five in each lot. They were confined as before, each lot to a sty, and cleaned at the same time: their food was as follows:

- No 1. Bran mixt with skim milk.
 2. Boiled potatoes.
 3. Boiled carrots.
 4. Raw carrots.

They were kept to this food thirty days. I then viewed them as before with the same person.

- No 2. Much the best,—boiled carrots.
 1. Next,—bran and skim milk.
 2. Next,—boiled potatoes.
 4. Worst,—raw carrots

Boiled carrots appeared very clearly on this trial to be an admirable food for hogs of this age; *so good*, that I determined to make use of this hint in future. Boiled potatoes appear also a good food. Raw carrots keep them, I think, better than the farm-yard, but were not equal to the other kinds.

EXPERIMENT III.

January 1, 1766: forty pigs that had been weaned about a fortnight, were draughted very equally into eight lots, and confined each to a sty; they were cleaned out, and littered always on the same day, and equally. Their food was as follows:

No 1.

- No 1. Raw carrots.
 2. Boiled ditto.
 3. Boiled potatoes.
 4. Pollard mixt with skim milk.
 5. Ditto mixt with boiled turnips.
 6. Malt-dust mixt with skim milk.
 7. Skim milk.
 8. Ditto, and half carrot water boiled.

They continued upon this food the month of January, and were then viewed; the result was as follows:

- No 4. The best,—pollard and milk.
 7. Next,—skim milk.
 2. Ditto,—boiled carrots.
 3. Ditto,—boiled potatoes.
 5. Ditto,—pollard and boiled turnips.
 8. Ditto,—skim milk and carrot water.
 1. Ditto,—raw carrots.
 6. The worst,—two dead, malt dust and skim milk.

Pollard and milk hitherto maintain the superiority; boiled carrots excellent; the rest almost equal, except the malt-dust, which is evidently bad.

EXPERIMENT IV.

In the beginning of June, 1766, I confined sixty hogs, half and three fourths grown, in my hog-yard (a pond's mouth in it), and fed them fourteen days with clover mown fresh every day; it was given in their troughs, with racks across, to prevent their soiling it. They fell off in their looks in about four days, and grew worse and worse, several dying. At the end of that time, I gave them some malt grains and wash every day, for a few days longer: but the effect was no better, more dying. They were then all turned into the clover field, from whence it had been taken, and confined constantly to it for some time. Not one more died, for all throve greatly. It will not perhaps be impertinent here to add, that I never found any method of using clover more beneficial than thus applying it to the feeding of hogs.

[To be continued]

THE
SCOTS FARMER,

[MAY 1774.]

ARTICLE XLI.
FARMERS KALENDAR.

JUNE.

Turnips.

THIS is the great season for sowing turnips: later sown crops scarcely ever arrive at the size of those sown in June. There is a common idea among the farmers, that the turnip season lasts just a month, a fortnight before and a fortnight after *midsummer*; but let the husband-man make good use of the first fortnight, the later will not equall it, unless the weather is more favourable. The land I suppose to have been plowed for the last time but one, in *May*: the beginning of this month, the manure should be carted on to it, which, in a well ordered farm, should come from the farm yard; and if that does not yield a sufficiency to cover a fourth part of the arable land, the farmer is a bad one. If he has a thorough command of litter, and money enough in his pocket to buy plenty of cattle, it will cover a third of it; but whatever quantity of turnips he has, let him dung them well. In this work he should proceed regularly, beginning one side of the field, and laying the heaps in lines from top to bottom, it should be spread immediately, and the ploughs follow directly to turn it in. Upon that plowing, the seed should be sown without loss of time, and covered by two or three harrowings, according to the fineness of the land. I have some-

times seen the dung carried out a week before it is plowed in; but that is very bad husbandry: for much of the goodness of it is carried away by the sun. It should be taken in full fermentation from the heap, and turned directly in, so as to ferment under the moulds, which will ensure a great crop. If the farm employs many teams, it will be proper to proportion them, so as to let the manuring, plowing, and harrowing, be constantly going on without interruption. As to the seed, observe well, to sow the great round turnip, that lies quite above ground, and holds to it only by a small tap root, it grows larger than any other, and has the excellent quality of being used in winter with much greater ease than those sorts, which root quite below ground, and are consequently not to be got at in a slight frost. Sow about a quart an acre: less than a pint is sufficient, perhaps half a pint, if they will grow, and escape the fly; but I have seen many thin sown pieces totally eaten up, when the thick sown ones have suffered much, and yet enough escaped for a crop.

In extreme dry seasons, much seed will not vegetate, but such instances are rare: the most common misfortune is the fly; which eats them off before they gain the rough leaf. Many remedies have been proposed for this evil; but none that are effectual. Steeps for the seed are mere quackery, strewing foot over the plants, as soon as attacked, will very often save them, but the remedy is very expensive, because on numerous soils at this season, the foot will be of no service as a manure. The very best dependence is on the richness of your soil, if it is extremely fertile, or full of dung, the growth of the turnips will be forced; so much accelerated, that they will presently grow out of the power of the fly. I have often remarked, in fields partly dunged, that those lands, which received no manure, have been totally eaten up, while the dunged parts have escaped clear. Without manure, the growth is

is so flow, that the enemy has many opportunities to attack the plant.

When a crop is totally destroyed, the farmers plow and sow again, which should never be omitted, if you have time. Probably you may do this, and yet get your crop in in June, which will be a fortunate circumstance attending a first early sowing.

Cabbages.

Upon your cabbage lands you should pursue the same maxims as above laid down for turnips, only in plowing the manure in, always throw the land on to the ridge, and set the plants in a single row on the top of each: so the dung is covered up in the ridges, and the plants in a proper situation for profiting by it to the utmost. As to the distance of the rows, you must be guided absolutely by the richness of the soil; if you find the plants join from row to row, when at four feet, then you have proof, that they should not be planted nearer; but if they no more than join, on three feet rows, then you would lose in the crop, if you gave a greater distance: two feet from plant to plant, is the proper distance.

When the manure is spread and turned in, the proper way of planting will be, to send women or children in with bundles of plants, to drop them on the tops of the ridges, at about two feet distance. They will lye ready for the men, who may then plant almost as fast as they can walk; but if they have to get, carry, and set the plants, they will not be able to do near the work they might with better contrivance. The rows at four feet, may be planted at five shillings an acre. It is a rule among the cabbage-planters in husbandry, never to water the plants, let the season be as dry as it may, insinuating that it is entirely useless. Upon this I shall venture to remark, that in most years,

years, if the land is in fine tilth, and well dunged, this may be right, as the expence must be considerable; but I should apprehend, that in very dry seasons, when the new set plants have nothing but a burning sun on them, that watering would save the lives of vast numbers, and might very well answer the expence, if a pond is near, and the work done with a water-cart.

There is one use in cabbages, which appears not to have met with the attention it merits: it is the planting on those lands where turnips have failed. A late sown crop of those roots scarcely ever comes to any profitable amount; but cabbages planted on the land without any fresh plowing, would turn out a very beneficial crop for sheep late in the spring, in all probability (unless on very light, sandy, or limestone soils) of greater value than the turnips, had they succeeded.

No farmer can entertain too high sentiments of the necessity of gaining crops of green winter food: the importance of having such food for his cattle, and not depending totally on hay, is one of the clearest axioms in the whole range of husbandry. His profits will be amazingly lessened: his loss in the want of manure felt severely for many years, and on farms not abounding with hay, his expence in buying it, or his loss in selling his cattle will be equally great; but besides these accumulated evils, there is another of a different nature which he should consider well: it is the change of his course of crops. After either turnips or cabbages, he sows spring corn, and with that spring corn, clover, on some soils the grass is left but one year, in others two, and in others mixed with ray-grass, three, four, or five. The lay is plowed up, and wheat at once harrowed in. This is at once compendious, cheap, and yet most excellent husbandry; for the whole duration of the grass is a constant fund of profit, at scarce any expence, and the preparation for wheat is carrying on all the time in the most beneficial

beneficial manner. But if the turnips fail, and no cabbages planted, what is the consequence? Why, the farmer sows wheat on the fallow, in hopes of a good crop, to pay him for so much tillage as the land has received. This introduction of that grain at once, breaks the whole arrangement of his farm, and he is forced either to begin again, or to pursue that pernicious husbandry of sowing two crops of white corn running. He must either fallow for turnips again, or take a crop of barley, and then turnips: thus is he thrown out of his clover, though as important a crop as any on his farm, and launches into a series of tillage, that cannot but prove very expensive to him, without repaying half the benefit that the clover course would have done.

For these reasons, when the turnips fail, and cabbages are not planted, the land should be laid up in winter for barley, and the clover sown with it, which will turn out far more profitable than throwing in wheat.

The cabbages planted in *April*, and hand-hoed and horse-hoed in *May*, should now have the second of each of those operations given: a hand-hoeing the middle of the month, which must cut up all weeds, and break the earth well of the narrow slip on which the plants were left. Towards the latter end, the plough should go another bout in the intervals, splitting the ridge thrown up in *May*, and returning it to the rows. These operations will be of very great utility to the crop.

Carrots.

The carrot crop, will, in all probability, require a hoeing this month, about the latter end of it. It should be performed with common hoes, and the men who execute it, should take good care to kill all remaining weeds, and wherever they left the carrots double before, to set them out to the proper distances, this being the third hoeing, the
land

land should be left in such order, as to require no more work, or at least, nothing more than once going over it the latter end of August, to cut up straggling weeds, which may by that time have arisen.

Potatoes.

Another hand-hoeing must be given the potatoe crop, which should be so effectually performed as to preclude the necessity of any succeeding ones; because the plants will be too much grown to be hoed without damage in the operation. The crops planted in rows for horse-hoeing, must have the second this month, given with the swing plough as before; it must split the ridge before thrown up, and lay it equally to the rows.

Flax.

Weed the young flax; this is an expensive operation, but the crop depends on it: it must therefore be effectually performed.

Lucerne.

The lucerne, drilled in the spring, will now want a very careful attendance. It will not be adviseable to horse-hoe it the first year, because its great tenderness will not bear any accidental evils that may arise in the operation; but the hand-hoes should be kept dilligently at work; the land kept throughout this work, perfectly free from weeds, and the surface well broken by the hoes, to keep it from any degree of binding. While the men are hoeing, they should never omit to stoop and pluck out such weeds with their fingers as grow among the plants in the rows: This is highly necessary; for if they are left they will injure the young lucerne much. Whoever cultivates this grass, must absolutely determine to spare no expence in the eradication of weeds: if it is not done in the most perfect manner,

the

the crop will answer very poorly. There is no plant will bear the neighbourhood of weeds so badly, and especially while it is young. If the hand-hoes are applied in time, and often enough, the expence will not be great ; but if through saving you defer it till they are gotten much a-head, the crop will be either totally lost, or the expence of cleaning be enormous.

The old crops of drilled or transplanted lucerne, will be ready for cutting this, as well as every month through summer, if the land is made rich enough for it, and the weeds are never allowed to rise. After the cutting, horse-hoe the rows, each time the reverse of the former ; and in respect of hand-hoeing, be guided by the weeds : give it as often as necessary to destroy them absolutely and completely.

Some cultivators have found a difficulty in the cutting lucerne : They say that in mowing it, if the intervals are kept in fine tilth, so much dust is taken up with the crop, that the cattle will not eat it : But in answer to this I may observe, that if weeds enough are left to prevent this evil, the crop will be destroyed. It should be either reaped and laid at once into a cart, or on heaps, or else the inconvenience submitted to ; which, I might observe, cannot be any thing like so great as some people imagine.

Sainfoine.

The latter end of June, the Sainfoine crops will, in general, be ready to mow : they should always be made into hay ; for no grass in the world answers so well for that purpose. It is a common thing to gain from two to three tons per acre, on dry good land, that with any other crop would yield none at all : and the after grass is extremely valuable ; much more so alone, than the former value of the land.

Clover.

Clover.

The latter end of June, the clover crops will be ready to mow; in many situations it will not be adviseable to feed any more of it than can be dispensed with, the hay paying so much better.

In the making of all artificial grasses into hay, particularly clover and Sainfoine, it should be observed, to act quite differently from the making natural grass. The latter is strewed about soon after mowing; but the former should lye in swarth a day or two, then turned carefully, and lye a day or two longer. In good weather this makes it sufficiently. It may then be got into cocks, in which it should remain about two days, and then carted to the stack. The whole is a very easy and cheap process.

Meadows.

The very early or rich meadows, and the highly manured upland pastures, about great cities, will be ready to mow in June. In executing the work, observe particularly, that the labourers cut as close to the ground as possible; grass never thrives well that is not mown quite close, and the loss in the crop of hay is very considerable; for one inch at bottom weighs more than several at top. In the making it into hay, you will be a loser, if you have not many hands ready for the work, it should be shaken out directly after the scythe; wind-rowed, that is, raked into rows, before the evening, shaken out again next morning, and in the afternoon got into grass cocks: these should be opened the morning following, and got into the great cock by night, by which time the hay will be well made, if no rain comes; but in case of bad weather the process will be more tedious. If successive rains come, so that the hay is damaged, and you are fearful of its turning out unprofitably, by all means salt it as you stack it; a peck strewed in layers on the stack to a load of hay; it will have a very

great effect in sweetening it, however bad it may be, even to blackness; and it has been found by experiment, that horses and horned cattle will eat damaged hay, if salted, in preference to the best.

The Teams.

Continue to soil your horses and oxen in the stables, or under sheds, upon lucerne mown every day or two, and take care to have great plenty of litter, to spread under them, for treading into dung. They will raise immense quantities of most valuable manure, with this management, and at the same time, be kept at a much cheaper rate, than if turned into any kind of pasture.

Horse-hoeing.

The drilled crops, in general, of wheat, barley, oats, pease or beans, must be horse-hoed, at least once in June. If they had received a first horse-hoeing in May, then this of June must reverse it: throw the earth back again to the rows, splitting the ridge in the middle of the interval. In these works of horse-hoeing, two horses should be used, one before the other, and the plough should not be carried nearer the rows of corn than four inches: even at that distance some of the corn will be apt to be buried. These remarks are offered for those, who drill all sorts of crops; but the new husbandry cannot be recommended for white corn or pease: beans it is incomparable for; turnips it is said to do well for.

Fallows.

The fallows, whether for wheat or barley, should this month receive a stirring; by which the crops of weeds, that have arisen since the land was plowed and harrowed fine, the

latter end of April or the beginning of May, will all be turned in and destroyed: no other tillage will be requisite this month to them.

Buck-wheat.

In case the month of May was very unfavourable to the tillage of spring corn lands, buck-wheat may yet be sown; but it should not be ventured in the ground after the first week or ten days. This crop bearing to be sown so late is, in many cases, a most valuable circumstance. By means of it, you have time to get the land into extreme good order, and quite free from seed weeds. If the stubbles are broken up in October, he must be an indolent farmer, that cannot get his land fine and clean by the end of May.

Sheep.

In this month the flocks of stock sheep are regularly managed: They live on the commons and sheep walks, with little change or trouble. The stock intended for fattening; such for instance, as wethers bought in in April or May, and intended to be sold fat from turnips or cabbages the following winter, should be kept not like fat sheep, but throughout this month on the poorest of your food; they may be turned on to your commons or sheep walk, or into your bare pastures, and kept so for eight hours a day, and then give them a bait for two or three hours in your clover or ray grass, or good natural pastures; after which they will be ready profitably to fold. Early in the month, the lambs of a flock should be gelt: a work that should not be delayed longer.

Now also is the time for shearing sheep. In this work the young farmer should be attentive, and fix on the steadiest and most careful of his labourers for it. If he does not keep a shepherd, they must be washed in a pond or river three or four days before, taking the opportunity of

a warm day. Two men hold the sheep, and wash his wool quite clean; and another or two must attend to bring them. The only rule in doing this work, is, to wash them till the wool is quite clean and white. Some people have a notion, that it will kill the fish of a pond; but this is a mere vulgar error: on the contrary, the vermin that are washed out will feed them well.

In a day or two after the washing, they must be sheared, in which business the principal care is to see, that the men do not stick the points of the shears into the sheep, nor clip or wound the skin. A man that understands the business well should attend to wind the wool into fleeces as fast as it is cut, and should take care to turn in all the damaged or ill looking parts, so as to make as handsome a fleece as he can: The farmer will find the advantage of such a conduct when he sells his wool. In some countries, the whole business of washing, shearing, and winding is done by the great: the price varies; but it is three shillings and six pence a score of sheep, where the men have one shilling and sixpence a day at that season of the year.

Folding.

This is a capital month for the sheep fold, and the benefit of this manuring is so great, that he is an idle farmer who does not make the most of it. Now you should fold the cabbage and turnip land, which are the crops that will soonest succeed the operation: the general rule for all manuring. Give each sheep a square yard in the field, and go two nights on the same land. After your cabbages are planted, and your turnips sown, if the land is very light, continue the folding on the turnips till they come up; but, after that, you must remove to your crops of grass, that are mown regularly for soiling your teams within the ox-house and stable. As soon as a spot is mown, fold it, but only one night, and immediately after horse-hoe

hoe it. If the rows are too narrow for that operation, hand-hoe it; and if the crops are broad-cast, harrow it. But whatever be the operation, it should follow the sheep so as to bury the dung directly. This use of the fold will last till about a fortnight before wheat sowing, when you should move again.

Thistle the Wheats.

In this month, the crops of wheat, if any thistles has arisen in them, should be weeded. The best manner of performing the work is with a small hand-hook. It should not be deferred longer than the beginning of June, or damage will be done to the crop by the treading.

Dig Marle.

This is a good season for marling of land: one of the most important works that can be done in husbandry. All farmers that have marle under their fields, and do not make use of such a treasure, are much to be pitied; it may be called the Prince of manures.

In some countries, it is the common manure; and almost every where to be found when dug for; in such places the farmers have nothing to do, but to get money enough to resolve on the undertaking; they all acknowledge the expediency of the work, and seldom dispute the great profit of it; but in other parts, the knowledge of marle is very confined. It may perhaps be discovered half a century before it comes into general use. In tracts of waste land, or sheep-walks and warrens, let at a shilling or two shillings and sixpence an acre, marle being discovered, and rendering such land capable of yielding noble crops of turnips, clover, and all sorts of grain and pulse; the uncommon effect, and the amazing advantages made by it, are so striking, that the use spreads fast. But on the contrary, when marle is found under richer soils,
(inclosed

(inclosed countries, for instance, of 10 or 12 shillings an acre), the case is different: it will make no such improvement, as on the poorer lands; and as great fortunes are not suddenly made by the use of it, the farmers will not be persuaded to use it with any spirit, possibly not at all: they think, that a rent, comparatively higher than the other tracts, will not allow of their spending such sums about it: that they will not reap equal profit is undoubted, but why not accept of twenty per cent advantage? should they reject it because they cannot command fifty? If tenants are backward in making use of marle in lands of 10 or 12 shillings an acre, their landlords should set them the example, and shew them that the work will answer well.

Marle is of various sorts, and lies in various strata: in some places it is a soft, fat, soapy substance; in others, it is hard as chalk, which are called stone-marles: sometimes you find it white, sometimes grey; also blue, yellow, and a dark brown. In some counties you have shell-marle, which is composed of nothing but marine shells. The depths at which it lies are various: sometimes only three feet from the surface, at others ten or twelve, and in some places so deep, that it will not answer to get it at all. The strata are also of different thickness from two feet to twelve feet deep; but the general circumstances in which all true marles agree, and which denote them to be real, are the effervescence with acids and the falling in water. The crackling in the fire is a good sign, but not alone determinate.

If it is uncertain what strata are under a farm, it is ever adviseable to use the screw-borer, to discover what soils are within reach. By means of that instrument, you discover, at a trifling expence, if there is any marle at command.

The best way of conveying it on to the land, if it does not lie very deep, is to open a sloping mouth, sinking the pit gradually, wide enough for a cart to drive in and out; and
when

when you come to the marle, to work it away circularly, and to keep the pit ten or fifteen feet deep, by which means the expence of filling the carts will be much lessened. The expence of marling, when it is thrown in this manner into the cart, will be, upon an average, three pence half-penny per load of 30 bushels, the filling and spreading ; and about four pence-halfpenny for the teams, carts, and drivers : in all, eight pence per load, or L. 3 · 6 · 8 Sterling per hundred loads. This will be a proper quantity for an acre of land : The benefit will last for twenty years, and the land always be the better for it.

Where the marle lies too deep for this work, pits are sunk like wells, and the marle drawn up in buckets : This will cost alone six pence *per* load of 20 bushels, or nine pence that of 30, which added to the eight pence of the above makes one shilling and five pence in all ; or for 100 loads L. 7 : 1 : 8, which is the amount *per* acre. This expence will be thought high only by those, who have been used to the inferior one of L. 3 : 6 : 8 ; but in reality it is one of the cheapest methods of manuring land : for, considering the number of years the manure lasts, the price *per annum* divided will amount to a very small sum annually.

Dig Clay.

Where marle is not to be had, clay, in many places, is to be found at a moderate depth. This manure has none of the properties by which marle is to be known ; but yet it works wonderful improvements on many soils. In some light lands it has been preferred by many very good farmers to indifferent sorts of marle ; and this preference has been the result of attentive experience.

But the great point concerning clay is not so much the comparison with marle, as the use of it where no marle is to be had.

On all light sandy soils it should be used with a confidence of success; for the precedents of its good effects are so numerous that they have not a doubt of its excellence. About one hundred loads an acre, at the same expence as of marle, will work an improvement great enough to shew how much mistaken they are, who think nothing but the finest marles worthy of attention; and upon heavier soils, such as wet loams, brick earths upon clay, and loose hollow soils, that want a firmer texture, clay is an excellent manure; but there are vast tracts of such land that cover very fine veins of clay, and yet the farmers know nothing of the use of it. It is much to be regretted that their land-lords do not give them a juster idea, by being at the expence of claying some small fields, until the benefit of the improvement becomes conspicuous.

Empty Ponds.

This is a proper season for emptying ponds, and cleansing rivers; for, being early in the summer, you will afterwards have an opportunity of turning the mud over twice or thrice; and thereby sweetening it, and laying it into the proper state for bringing it on to the land. This is a part of husbandry too much neglected by most common farmers, but advantage should always be taken of it by a good husbandman, when he is lucky enough to succeed a great flood; for then he will probably find all the ponds, &c. full of rich mud.

It is impossible that pond mud, especially if there is a stream into the water, should ever fail of proving a most excellent manure, when judiciously used. The method of managing it which has been found the most beneficial, is the following.

As soon as the mud is dry, and hard enough to spit, turn it over, and, in about three weeks or a month after, mix it
with

with an equal quantity of chalk or marle : it matters not which you move : either bring the chalk to the mud, or carry the mud to the chalk. If lime is cheap and plenty, it will be an excellent management to add about half the quantity of mud in lime. Let the whole be mixed well together, and remain until September, when it should be turned over again, and spread upon pasture or meadow land in October. This is husbandry that will pay any man well.

ARTICLE XLII.

Of the culture of Sain Foin, or St Foin.—Of the culture of Lucerne.

[FROM DICKSON'S AGRICULTURE.]

THIS grass is, by those that treat of Agriculture, reckoned much preferable to clover in many respects. The crop they say is larger ; when eaten green it does not hurt cattle, it makes better hay, and it continues four times longer in the ground. When, to these advantages it is added, that a good crop of this grass will grow upon land that will bear no other, one cannot help expressing the greatest surprize, that all this should be true, and yet that the culture of St Foin should make so little progress in Scotland. Good grass is almost as valuable here as in England. We have enough of bad land, and yet we have little or no St Foin. I must acknowledge, that I am sometimes almost tempted to think that the authors, who treat of agriculture, borrow the conjectures of others, much more frequently than represent facts upon repeated experience. I must however do Mr Mortimer the justice to observe, that he does not pretend to any certainty in this point

point, and delivers the opinions of others rather than his own.

As we have so little of this kind of grass in Scotland, it cannot be expected, that any directions can be given about the manner of cultivating it founded upon experience. All that I propose, is, to make some observations upon the facts mentioned by the authors that treat of this subject, and deserve the greatest credit.

St Foin is a plant that has a very long tap-root, which is able to pierce very hard earth, and which sometimes pushes itself downwards even into the cliffs of a rock. Mr TULL says, that "He was informed by a person of undoubted credit, that he had broken off one of these roots in a pit, and measured the part broken off, and found it fourteen feet." The same author mentions a vulgar opinion, which is, that "St Foin will not succeed on any land where there is not an *under-stratum* of stone or chalk to stop the roots from running deep, or else they say the plants spread themselves in the roots only, and cannot thrive in those parts of them which are above ground." But, instead of exposing the absurdity of this way of reasoning, as Mr TULL has done, it would have been better to have distinguished betwixt the opinion and the reason adduced in support of it; for these are very different. The opinion may be well founded, though the reason adduced is absurd. The opinion may be founded upon repeated experience and observation; while the reason may be nothing but a conjecture of some person, trying to account for an appearance in vegetation, that is a little uncommon. It seems to be allowed by all, that St Foin delights most in a dry soil. Deep soils, especially those that have an *under-stratum* of clay or tile, are generally wet at the bottom; this wetness destroys the St Foin; and this may have occasioned the opinion, that this grass does not succeed on deep soils. On the other hand, land that has

an *under-firatum* of stone or chalk is generally dry. On this soil then the St Foin plants naturally thrive at first, and pushing their roots down through the clefts of the rock, and receiving the vegetable food that the rain naturally carries into these, continues to increase, and at last comes to the greatest perfection. Persons observing the St Foin flourishing on this kind of land, and not knowing that it pushed its roots into the clefts of the rock, might conjecture, that the resistance which its roots met with from the rock was the cause of this.

The roots of St Foin, properly nourished, grow very large, and the larger they are they penetrate to the greater depth; and hence we may conclude, that the St Foin that thrives well receives a great part of its nourishment from below the staple of the soil. Mr TULL mentions nine tenths; but this, except in some very particular cases, is certainly too much. Numbers of experiments however discover, that the roots of plants extend themselves in proportion as they find proper nourishment. There is no doubt therefore, that the roots of the St Foin find nourishment, even at the great depth to which they penetrate.

This points out to us, not only that deep soil, or soil that has a bottom through which the roots of the St Foin can penetrate, is the most proper soil for this kind of grass; but also that it is of the greatest importance, to cultivate it in such a manner as to render the plants most vigorous. To render the plants of St Foin vigorous, it seems necessary, that there should be but few of them. Then sowing alone does not answer this purpose. By it indeed there may be as few plants of St Foin as one pleases; but this of itself does not make the plants vigorous, even upon a soil that may be proper for them. There are very few fields that are not infested with weeds of some kind or another. These come up along with the St Foin when it is sown, and hurt the plants as much as if the St Foin itself was
thick

thick sown. It seems necessary then, that the seed be sown in such a manner as to render it easy to destroy the weeds that come up along with it. The sowing it in rows by a drill is without doubt the most proper method for this; for then not only the weeds, but also the supernumerary plants, can easily be removed.

It is several years before St Foin comes to its full strength; and the number of plants sufficient to stock a field, when it is in this imperfect state, will make for the first year or two but a poor crop. It seems necessary therefore, that it be sown in such a way as to make it easy to take up plants in such numbers, and in such order, as always to leave the proper number in their proper places in the field. The sowing in rows at proper distances, by the drill, is likewise the proper way of doing this. Suppose that a field is drilled in rows at ten inches distance, the partitions may be hand-hoed, and the rows dressed in such a manner as to leave a proper number of plants. In this situation the field may remain two years. Then one fourth of the rows may be taken out in pairs, in such a manner as to make beds of fifty inches with six rows in each, and intervals of thirty inches, which may be plowed. Next year, another fourth of the rows may be taken out in the same manner, so as to leave double rows with partitions of ten inches, and intervals of thirty. All of which may be hoed, or only hoed alternately, as found most proper.

The great quantity of this grass, which the authors that treat of this subject assure us may be raised upon an acre, and the great value and excellency of the hay made of it, should certainly engage some persons to be at some expence in making a compleat trial, and even to make use of the spade instead of the hoe, or hoe-plough if necessary. In this case, instead of taking up two contiguous rows, the intervals to be hoed by the plough, every fourth row may be taken up, and the intervals dressed by the spade, and
after-

afterwards the other proper rows taken up as found most convenient, till the field is left in the situation as mentioned above, in double rows of ten inch partitions, and thirty inch intervals. Several other methods of lessening the number of rows might be mentioned ; but these will naturally occur to every person who makes the trial when he inspects the field.

The plants taken up from a field of St Foin may be set in another field ; and if the transplanting of St Foin succeeds as well as the transplanting of lucerne has done with Mr Lunin de Chateau vieux, the trouble and expence of this will be sufficiently ballanced by the largeness of the crops. There is this particular advantage that may be expected to attend this : The St Foin may thereby be made to thrive on land unfit for it when sown. In transplanting, it is necessary to cut off a great part of the long tap root ; this prevents it, after it is put into the ground again, from striking very deep, and makes it push out large roots in a sloping direction, from the place where the tap root is broken ; and the St Foin, thus managed, may thrive on land that is shallow, or has a wet bottom, provided it is not overstocked with plants. M. de Chateau vieux found, that this happened to the lucern which he transplanted ; and there is scarcely any reason to doubt, that the same will happen to the St Foin.

Any person that proposes to try the culture of this grass, does not need to have it told him, that he ought to be at the greatest pains in preparing the land for it, and particularly in making it as free of weeds as possible. The great value of the crop should naturally induce him to this.

I am very sensible, that many farmers must be deterred from attempting to raise this grass, by the trouble and expence that must attend it. However, it must be remembered, that no new thing can be introduced without both these

these; and if this plant is of half the value, that those that treat of the culture of it represent; the farmer that introduces it into any part of Scotland, will not only reap great benefit himself, but do an important service to his country.

Of the culture of Lucern †.

This grass, as well as St Foin, we have originally from France. It is the same with the *medica* of the ancients. The great encomiums given this plant by authors, both ancient and modern, justify us in making a very particular enquiry into its culture, to try if it is possible to introduce it into this country.

There are indeed, some spots of it to be seen in different places; but these are not much more frequent than they were twenty years ago; so that it would seem, that the farmers are still of opinion, that the crop does not overbalance the trouble and expence of raising it; but had they the expectation of being able to raise a crop, nearly equal to what this kind of grass is said to produce, and which it certainly has produced in other countries, there is scarcely one person that has opportunity, that would not make the trial.

This grass was called by the Romans, *medica*, because it was considered as a remedy for sick cattle, and small quantities are at this time cultivated in Switzerland for this purpose; or rather perhaps, because it was brought from Media during the Persian wars in the time of Darius, as Pliny

† Though this plant is hitherto cultivated in this country for curiosity only, yet the apology made by our author in his first paragraph, for treating of it, will sufficiently excuse us for taking this chapter into our collection. As it is a curiosity, to omit might be reckoned blame worthy; and some more adventurous farmers may be induced to try some experiments of it on a larger scale, than has hitherto been attempted in this country.

Pliny informs us. Columella says, that a *Jugerum*, which is less than half a Scots acre *, was sufficient to maintain three horses for the whole year.

Paladius likewise asserts the same thing. A late author seems to think, that these Roman authors have exaggerated a little, as the methods of cultivating lucern are now improved, and yet no such large crops produced. In support of this, he says, that a husbandman among the Romans allowed 20lb. of lucern hay at night only to a working ox. And supposing the same quantity to be given to a horse, the crop becomes altogether incredible. Cato directs, that 18 lb. 12 oz. of hay be given to each ox at night; and Columella informs us, that 30 lb. in the day is sufficient for an ox, in the season of his severest labour. But the hay mentioned by this author is not lucern, but common meadow hay. For after observing, that in dry countries the oxen must be fed at their cribs, with such food as the country affords, he mentions the kinds that are reckoned best, among which he places meadow-hay. It seems past all doubt, that Cato means the same kind of hay, as he does not treat of the culture of *medica*, nor so much as mentions it. Mr Lunin de Chateau vieux in the environs of Geneva, as shall be afterwards shown, raised crops of lucern, at the rate of 8480 lb. of hay upon the *Jugerum*, which affords near 24lb. for each day through the whole year; and this, according to the trials made by the same gentleman, is sufficient food for three horses.

M. Lunin de Chateau vieux says, that from an arpent of land, which is about 1.008 parts of a Scots acre, in the environs
of

* A *Jugerum*, according to Columella, contained 28800 Roman feet. A Roman foot is equal to 11.604 English inches; so 28800 Roman feet are equal to 26930 English feet. The Scots acre contains 54760, the half of which is 27380, which is 450 feet more than the *Jugerum*. A *Jugerum* is nearly 490. of a Scots acre.

of Geneva, planted with Lucern, he had of dry hay, lb.

In the year 1754	15300
1755	13306
1756	17108

This is nearly in the proportion of eight tun upon the Scots acre. But this is not all; This gentleman represents the hay of this grass as infinitely superior in quality to the common hay; and expressly declares, that his horses, fed partly with the common hay, and partly with this hay chop, were in better order than when fed with common hay and oats. He says, it was his custom to feed his horses upon this hay in the summer season, when their labour was most severe. He adds, that five or six *libs* of it in a day are sufficient for an ordinary horse. This, however incredible it may appear, is yet past all doubt, as the great exactness of this gentleman, in every thing which he has undertaken, renders his authority unquestionable.

This grass has another quality; it lasts very long. Columella says ten years, Pliny says thirty years. The common opinion is ten or twelve. M. de Chateau vieux, after some years experience, says that he does not know where its increase will stop; and Mr Tull mentions a plant in his own fields, that had stood 22 winters, and yet remained as strong as ever. As almost all the fields of lucern that have failed, have been destroyed by the natural grass, it is impossible to determine how long it may continue, if freed from this enemy.

One would think, that the prospect of so valuable a crop should engage the farmer to make a complete trial. For, after paying all the expence that we can suppose the cultivating an acre of land in the highest manner can cost, yet still the crop must bring more profit to the farmer, than any other he can raise. But however, before it can be expected that he will engage in this expence, it is but reasonable that he should see a probability of raising a tolerable crop.

Different

Different plants are adapted to different climates, and therefore the having a valuable crop in in one place, does not make it even probable, that a valuable crop of the same kind of plant may be raised in another place where the climate is different. But then it must be observed, that this plant has been tried already in this climate, and it is found, that when the seed is good, it comes up very well, grows and stands the winter frost. This makes it evident, that a crop of this grass may be raised in Scotland. But the question is, Whether the difference of our climate from the climate of Italy, or the environs of Geneva, gives such interruption to the culture, or so far lessens the crop, as to render it not worthy the expence and trouble? It is certain, that the climate of Italy, being much warmer than the climate of Scotland, the natural grass, which is the greatest enemy to the lucern, is more discouraged, and the growth of the plant rendered quicker, which gives more cuttings in the season, and consequently a greater crop. But then it may be opposed to this, that some of our land in Scotland is much richer than the land in the environs of Geneva, that carried the large crop that has been mentioned. The land in the environs of Geneva, as shall be afterwards shown, is very poor, when compared to the land of our corn countries in Scotland. And where the land is better, it may be expected, that, if the proper culture is given, the cuttings, though fewer in number in the season than in a warmer climate, will however be more plentiful, and the crop on the whole thereby rendered equal. It is true, that there is much greater difficulty in making hay here than in that climate, which may occasion some inconveniency; but some method may possibly be fallen upon to remove this inconveniency, when there is more of this grass than the farmer can dispose of without making it into hay.

Though the plants of lucern raised in this country have stood the winter, yet some doubt may remain, whether our
severe

severe frosts may not destroy it. To remove all doubts of this kind, let it be observed, that in the year 1755, the frost in the environs of Geneva was so severe, that M de Reaumer's thermometer was some days at different times 8, 9, 10, 11, 12, and 13 degrees below the freezing point, and on the third of February a thermometer in the open air stood at 16 degrés below freezing. It is said, that in the severe winter in this island, in the year 1739-40, Farenheit's thermometer, sunk only to 12 degrees. The 16th degree below freezing point in M. de Reaumer's thermometer, is equal to the third degree of Farenheit's, and therefore the cold in the environs of Geneva in the year 1755, was nine degrees in Farenheit's thermometer, below what it was in Britain, in the year 1739-40, and as none of the lucern suffered in the environs of Geneva in that severe frost, we need not be afraid that it will suffer in any frost that this country is liable to.

As there is then a very strong probability, that this valuable plant may be cultivated with success in Scotland, I shall proceed to represent the culture given it by those persons who pass such encomiums upon it, and shall begin with the method of cultivating it among the Romans as given by Columella.

To prepare the land for the seed, this author requires that it be plowed in the beginning of October, a second time in the first of February with great care, all the stones carried off, and the clods broken. He requires that it be plowed a third time in the month of March, and well harrowed; and when thus prepared, that it be made into beds of ten feet broad, and fifty feet long, old dung thrown upon it, and then sown in the end of April in the proportion of a Cyathus † of seed to fifty square feet. He directs further, that the earth be drawn over it with wooden rakes, immediately after it is sown, declaring that the heat of the sun,

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and

† A cyathus is about $\frac{1}{16}$ of an English pint. The seeds are extremely small, being about the size of Poppy-seeds, or rather smaller.

and touching it with any iron tool, is destructive. He requires that it be carefully weeded from time to time, that it be watered very often after it is cut; and that the first crop be not cut till it has put forth some of its seeds.

Mr Tull, with a design to show the absurdity of all the methods practised for cultivating this grass, attempts to turn this practice of the Romans into ridicule. It would have been much better, if he had considered the matter with more attention, and not have put his own conjectures in the place of their practices. He cannot account for their employing so much time and labour about it, except it was to find employment for their slaves. But he would not have expressed himself in this manner, had he considered, that when this labour was given to the *medica*, as shall be afterwards shown, a labouring slave cost about L. 50, or L. 60; that these slaves were cloathed and fed at almost as great expence, as the labouring servants in England, and that the interest of money was then six *per cent*, paid monthly. He was very solicitous in promoting a darling scheme, and this made him likewise over-look what Columella says, that a Jugerum of this grass would fully maintain three horses for the whole year, would last ten years, and the land be improved by it. The mentioning the number of cattle that any crop is sufficient to maintain, is the proper way of ascertaining its value; for by this we can always judge of its value, whatever may be the difference of the value of money. In this proportion a Scots acre of this grass may be justly valued at present at L. 36, which is allowing, no more than 4*d* pence a day for each horse; and if 6*d* is allowed, the value of the English acre will be as great, as the acre of asparagus, or cabbage plants, which Mr Tull places in opposition to it. Is there any farmer that would not think the highest culture he could give, well bestowed upon an acre, the produce of which is so valuable?

Mr

Mr Tull very justly condemns the Romans for their superstition, in not allowing an iron tool to touch their *medica*; as tools of iron might have been contrived, that would have greatly assisted them in weeding it. But though their superstition in this and many other things deserves to be condemned, yet I am far from being certain that the great men among them deserve to be condemned for their complying with it. When this is seriously considered, it will appear perhaps an instance of their wisdom rather than their folly. The adhering to these superstitions in agriculture was more necessary than in any other thing. There were very few tenants among them that rented farms from the proprietors, as in Britain: The farms were generally in the hands of the proprietors themselves. These gentlemen for the most part resided at Rome, and managed their farms by slaves under the direction of a bailliff, *villicus*, or a griever, as we call such a person in Scotland. This Bailliff was commonly chosen from among the slaves; such persons, we may well suppose, were very superstitious, and when the whole management of agriculture was in their hands, it became necessary, in some degree, to humour their superstitions. When Virgil says, 'The moon too hath allotted days auspicious for works, some in one order, and some in another. Shun the fifth.' No man of common sense imagines, that Virgil himself was so superstitious, as to believe, that any piece of work would succeed worse on the fifth day of the moon than on the fourth, or that it was better to take a journey on the ninth day, than on the tenth. But these being the received opinions of the common people, he humours them therein, that he may receive the more credit in matters of importance.

It is probable, that Columella might likewise humour the vulgar superstition in this and other things. He mentions the kind of weather that the rising and setting of the different constellations forebode; not that he believed that
this

this weather would actually happen, but in conformity to the vulgar opinion. We find, that he wrote some books against the astrologers upon this very subject, and he speaks of the Chaldeans as impudent in affirming, as a thing certainly to be depended upon, that the changes of the air answer to certain stated days.

The covering the lucerne seed by the plough, as was the common way in their corn and pulse, or perhaps even with their ordinary harrows with iron teeth, was found destructive: Hence the received opinion that iron was hurtful to it. And although Columella might impute this to the true cause, the burying the seeds too deep, yet he might adhere to the superstition as the most proper way to prevent this misfortune, which might frequently have happened, if the slaves had been allowed to make use of their iron tools, and which might thereby have been the occasion of discouraging the culture of so useful a plant.

That the manner of cultivating this plant, lately introduced, is preferable to the manner in which it was cultivated by the Romans, I shall very chearfully allow; but if, by the culture which they gave, such crops were raised as we have mentioned, they had no reason to change their method, and we have no reason to represent it as ridiculous or absurd. But this method cannot be so easily followed, nor indeed would it be so successful in this country as in Italy. The land in Italy is generally light, and the heats are so great as often to burn up the grass: this made it easy for them to keep the lucerne free from weeds, at least much easier than in this country, where our best land becomes hard in a short time, and where the common grass makes such quick progress. It is this that has prevented in a great measure the success of any trials that have been made in Scotland. In a few years the surface becomes so hard, and the turf so strong, that there is no possibility of getting the better of it, so that at last it destroys the lucern; and
this

this too, it is probable, long before the plant arrives at their greatest perfection.

This shows, that we cannot hope to cultivate this grass with success, unless we fall upon some way to destroy the natural grass, and prevent the surface from becoming hard and impenetrable : And in no way as yet found out, can this be done effectually but by horse-hoeing. This is what was proposed by Mr Tull, and has been practised with the greatest success by M. de Chateau vieux in the environs of Geneva, a crop that succeeds at Geneva, arising from a plant that is in the ground all winter, may be expected to succeed likewise in Scotland. It may be of use therefore, to represent in what manner this gentleman cultivates this useful and valuable plant, according to the accounts which he gives of it himself, in his letters to M. du Hamel.

This gentleman mentions nothing in particular, about the method of preparing the ground ; only when giving directions about the transplanting the lucern, he says, that as the lucern is to remain several years on the same ground, no pains should be spared in preparing the earth. The land on which he tried some of his experiments, had not been dunged for some years. However, the land on which any experiments are made in Scotland should be prepared as well as possible. The crop increased in a very small proportion of its value, will do more than over-balance all the expence of preparation.

He tried the sowing the lucern both in rows, in the beds where it was intended it should stand ; and the sowing it in a nursery, and afterwards transplanting it into the beds prepared for it. He prefers the transplanting, and gives this reason, that the lucern when transplanted, having a part of its perpendicular root cut off, instead of pushing perpendicularly downwards one principal root, as it does when sown, pushes out numbers of large lateral roots, which, being broke in the culture given it, branch out also into
others

others. This reason is sufficient to determine us to this practice; for though the root that nature has given this plant, is the most proper to enable it to contend with the other plants around it in its natural state; yet by dividing this root into many, and giving these a direction nearer the surface, it is rendered the more easily cultivated, and made to flourish in soils, in which, if left in its natural state, it could not live. It will not be amiss however, that we add some other reasons in favour of transplanting.

The land on which the lucern is to be planted, may be prepared during the summer, by which means the field, when planted with lucern in the autumn, must be in a much better situation, than if it had been sown in the spring, even supposing, that the land had been fallowed in the former season; and when it is sown in the spring in beds for horse-hoeing, the first year's crop is very small, and can scarcely be supposed to exceed it in value the expence of culture; so that by transplanting, one year is saved.

There is another thing that may be mentioned: by transplanting the lucern, the rows can be more regularly placed, and the intended distances more exactly kept. This is of greater importance, than perhaps appears at first sight. Thereby the hoeing can be performed more perfectly, and with less labour, and instruments may be made use of, like those contrived by M. de Chateau vieux, which with great exactness, may perform the whole work necessary in the alleys or intervals at once going; and alternately turn the earth from the rows, or towards them, as is necessary. To these I shall only add, that thereby the plants are set at the exact distances intended, and there is thereby a great saving of seed, which, though a small article, ought not to be overlooked.

The advantages of transplanting are confirmed by the experience of M. de Chateau vieux; for he says, that the lucern, which he drilled in beds, where it remained with-
out

out being transplanted, was not by far so strong and flourishing, as that which he had transplanted. He observes in favours of transplanting, that when seed is sown in the place where it is to stand, it requires to be thinned, which operation takes up more time than transplanting.

This gentleman likewise tried the lucern in single beds, three feet wide with single rows, in beds three feet nine inches wide with double rows, and in beds four feet three inches wide, with triple rows*. The plants in the single rows, were six inches asunder, and those in the double and triple rows were about eight or nine inches. In a course of three years, he found, that a single row produced more than a triple row of the same length.

Forty toises of a single row, produced of dry hay,

in the year 1754	205 lib.
in the year 1755	297
in the year 1756	201

in all 783

Forty toises of a triple row, produced,

in the year 1754	169 lib.
in the year 1755	180
in the year 1756	226

in all 575

The single row produced in three years 703

The triple row produced in the same time. 575

The single row produced more than the triple 128

* Supposing an English foot to be 1000. The French foot is 1068 of the same parts. So that three French feet are equal to three feet two inches and one half English. Three feet nine inches French, to four feet English; and four feet three inches French, to four feet six inches English.

It must be observed, that the single rows were only three feet distant from each other, but that from the middle of one triple row, to the middle of another, was four feet three inches; so that there were 68 single rows in 40 toises, in the same space with 48 triple rows.

68 Single rows of 40 toises, at the above rate of

703 *libs* in 3 years produced,

47804

48 Triple rows of 40 toises, at the above rate of

575 *libs* in 3 years produced,

27600

So that the field in single rows produced, almost the double of the field in triple rows; a difference so considerable, could not be produced by any accident. M. de Chateau vieux however does not pretend, from this experiment, to determine that the planting in single rows is the best way, as things may appear otherwise in other trials; though it is natural to suppose, that the crop in single rows will exceed the crop in the double or triple rows, still more in after years, than in the first three or four.

It has been already observed, that M. de Chateau vieux set the plants in the single rows at six inches distance one from another; he is of opinion, that they ought never to be set nearer. From what he says, it is natural to think, that they would do much better at a greater distance. He observes, that after the first cutting, the stalk formed itself into a head upon the top of the roots just above the ground, and that this head extended itself every year. The first year this head was from two to three inches wide; on the second it was generally about six inches over; and in the third year, almost one half of the plants had crowns of 10, or 12 inches diameter: and as they had not room to extend themselves along the rows, had taken an oval form to the sides on which they met with no interruption.

If the farmer then has reason to expect, that the plants of Lucern, which he sets, will flourish in the same manner, it would be better to set them at a greater distance from one another

another than six inches. Tho' this should lessen the crop in the first two years ; yet it is probable, that it would render it larger afterwards, as plants always thrive best, when they meet with least interruption. Had the plants in the rows, mentioned by M. de Chateau vieux, been set at 8 or 10 inches distance, they would have covered the surface with their crowns as much in the third year, as they did when set only at six inches distance, and the plants themselves being stronger, would have produced a larger crop.

This gentleman is of opinion, that the beds or ridges upon which the lucern is to be planted, ought to be raised in the middle, which can easily be done by the plough in forming them ; that a small trench, of two or three inches deep, ought to be drawn in the middle, and that in the bottom of this trench the plants ought to be set, covered with earth up to the neck. These directions are certainly very proper : the raising the ridges makes a greater depth of mould, makes the soil loose where the bottom of the root is placed, by which means the plant strikes root the more easily, and is the better nourished, by setting the plants in the bottom of the small trench, they are preserved from the drought, and the culture given afterwards, does not render so much of their tops bare, as it does when they are set higher.

He says, if the lucern is sown in spring in a warm soil, it will be ready for being transplanted in autumn, that September is the proper season for this, as the plants, if set then, will have time to strike root before winter ; that if the weather is too hot and dry in that month, they may be set in October, provided it does not freeze ; and that if the warm and dry weather prevents the transplanting in September or October, then the work should be delayed till the spring. In the environs of Geneva, I suppose, that the transition from heat to cold, is much quicker than in Scotland : so that it may sometimes happen in that place,

from the quickness of this transition, that there is no proper season for transplanting the lucern in autumn, but this can scarcely ever happen in this country, and therefore the autumn may be considered by us, as the proper season for transplanting lucern: The delaying it till the spring is a real disadvantage, and therefore ought never to be done but in a case of necessity; for the first crop after transplanting, according to M. de Chateau vieux, will be considerable if this is done in the autumn, but very small if done in the spring.

Though seed sown in the spring produces plants fit for being transplanted in the autumn, yet this gentleman observes, that plants two or three years old may be used. It is probable, that even much older plants than these will succeed. M. du Hamel says, that he took up the plants of a field of very old lucern, and set them in trenches. They were so old, that all his labourers said they were wore out, and yet there was not one of them that failed. They yielded three cuttings the season after, though the soil was not very proper for them.

M. de Chateau vieux directs, that the plants be taken out of the nursery with great care, that the roots may not be damaged; that the roots be left about six or seven inches long; that the green tops be cut off, within about two inches of the crown; that they be put into water as soon as taken up, there to remain till planted; and that they be planted with a planting stick in the same manner as cabbages.

He does not give any particular direction as to the times of horse-hoeing, only says in the general, that it is his opinion, that the alleys should be stirred once in the month, during the whole time that the lucern is in a growing state.

With respect to weeding, he says, that great care should be taken not to suffer any weeds to grow amongst the lucern, at least for the two or three first years; and for this purpose,

purpose, that the rows should be weeded by hand, as well as the edge of the alleys near the plants, where the horse-hoeing cannot go.

The proposing to hoe the plants once in the month, during the growing of the lucern may, perhaps, be thought very troublesome and expensive; but if the soil is once made free and open, this can be done very easily by the instruments which this gentleman has contrived. He has contrived one, by which the earth in the middle of the alley, is thrown on each side towards the rows; and another, by which the earth from the two rows, is thrown into the middle of the alley; so that at once going, the whole work necessary in the alley is performed; and in this way an acre may be hoed in less than three hours.

There is one difficulty which neither Messrs du Hamel nor de Chateau vieux take any notice of. Perhaps it is not a great difficulty either in the environs of Geneva nor in France where the summers are hot. What I mean is, the making of hay. Perhaps in these countries, in a day or two, the hay may be in a situation to be carried from the field, and put up in ricks. In this case there is very little difficulty. But it is otherwise in this country. Many days pass after the hay is cut in our fields, before it is in a proper situation to be put in ricks; and what to do with it before that time it is not so easy to determine. Mr Tull was sensible of this difficulty, and therefore to make the hay of horse-hoed St Foin, he proposes that every second alley shall be left unhoed, and that the hay shall be made upon the unhoed alleys. But this space not being three feet wide, cannot allow the smallest kind of ricks to be put up upon it, and therefore the hay must still be carried off while green. Besides, on this plan the rows want their proper culture, and the culture to the unhoed alleys must be severer when given. But this should be no objection to the making trials to cultivate this grass. There is still a great demand for green forrage; no kind of grass
can

can be supposed to answer so well for this as lucern, and before there are such quantities of this grass, as cannot be disposed of in green forrage, some better method of making the hay may be found out, than has as yet been thought of. Perhaps it may be found worth while to have a machine made on purpose for carrying it from the field, and to have a piece of grass ground set a part on purpose for making the hay. If a crop can be raised in Scotland, nearly of the value of those mentioned by M. de Chateau vieux, it may afford a very great expence in making the hay; and such a prospect must naturally engage persons to contrive the best methods for this purpose.

I have already observed, that M. de Chateau vieux has contrived instruments by which the whole work necessary in the alley is performed at once going. The one is in the form of a plough with two mould-boards, and a share, with a fin on each side, or, as we call it in Scotland, a sock with a double feather. This plough may be made either with or without a coulter, as the soil requires.

The other is formed, by placing two short beams on each side of the long beam, fixed strongly to it by cross bars, each of these short beams has a share fixed to it, with a long neck, and an eye into which the beam goes, and the fins are placed in such a manner as to serve for mould-boards, which turn the earth towards each other. These short beams are set at such a distance from each other as to answer precisely the width of the alleys.

If the soil is in its nature free and open, and if the field is well fallowed before the lucern is planted, it is probable that the whole work may be performed by instruments of this kind, and that those instruments may be made in such a manner as to go twice, or oftner, in one place, so as to stir the soil to a considerable depth where it will allow.

I am persuaded, that good crops of this valuable plant can be raised in Scotland, in no other way than this that
has

has been mentioned, and whoever is so happy as by trials to convince the farmers in his neighbourhood of the possibility of raising so valuable a crop, will merit the thanks of all the lovers of agriculture.

ARTICLE XLIII.

An Essay on the MANAGEMENT of HOGS; including Experiments on Rearing and Fattening them: By
ARTHUR YOUNG Esq;

[Continued from p. 316.]

EXPERIMENT. V.

AT the time of the preceding experiment, eight hogs, of equal size, were divided into two lots, and confined to two styes. Four were fed fourteen days on clover mown, and the other four on lucern mown; they were given at the same time, and in the same styes. At the end of that time they were viewed attentively: both were bad, but the clover ones much the worst, one near dying.

EXPERIMENT. VI.

The month of December, 1766, twenty pigs, that had been weaned a month, were draughted into four parcels, and kept that month, separately, in the following manner.

- No 1. Boiled carrots.
- 2. Boiled potatoes.
- 3. Boiled turnips.
- 4. Boiled cabbages.

At the end of the month they were turned out and viewed attentively. The result was,

- No 1. The best,—boiled carrots.
- 2. Next,—boiled potatoes.
- 3. and 4. Equal,—all nearly dead.

Carrots

Carrots continue in every trial superior to all common vegetable food. I am not at all surpris'd at the ill success of turnips and cabbages.

EXPERIMENT VII.

In June, 1767, I draughted from my hogs twenty that were of a perfect equality in size and appearance; they were even half grown; marked them into four lots, and turned

- No 1. Into my clover field.
- 2. ——— lucern ditto.
- 3. ——— sainfoine ditto.
- 4. ——— burnet ditto.

In another month they were drove up and viewed; the result was,

- No 2. The finest,—lucern.
- 1. Next,—clover.
- 3. Next,—sainfoine.
- 4. Very indifferent,—burnet.

The result of this experiment I think decisive in favour of lucern, and likewise in the proportionable merit of the other articles. But this must be farther enquired into in future experiments.

EXPERIMENT VIII.

In January 1768, three sows, very much alike in all respects, pigged, one seven pigs, another eight, the third six, in about a week. I ordered them to be fed distinctly.

- No 1. With raw carrots.
- 2. With skim milk.
- 3. Common wash of the better sort.

In a fortnight they were viewed. The pigs of
No 2.

No 2. Were the fattest,——Skim milk.

1. Next,——raw carrots.

3. Worst,——Common wash.

This experiment is not decisive, for reasons too tedious to mention; but yet the result should urge the attentive to vary these experiments, that certainty may at last be known.

OBSERVATIONS.

The general result of these trials is drawn into one view in a very few words.

Milk mixt with pollard appears to be, of all food, the most proper for rearing of pigs,

Milk alone is good.

Boiled carrots, excellent, and fully proved to be sufficient for any farmer to depend on, who does not keep a good dairy.

Potatoes are also a very good food.

Turnips, cabbages, and malt-duft, very bad.

Of green food, that which is growing, is clearly the best; mown and given in styes, it is pernicious.

In the field, lucern is superior to all the rest. Clover comes next, then sainfoin: all these three are good. Burnet last, and bad.

Experiments on fattening of Hogs

EXPERIMENT I.

In February, 1765, I weighed a bushel of white boiling pease, the weight was seventy-one pounds, the price 4 s. A bushel of pollard, twenty-five pounds one quarter, price 8 d. A bushel of bran, fifteen pounds one quarter, price 6 d. Quere, which is the cheapest food for hogs, seventy-one pounds at 4 s. or twenty-five pounds at 8 d? The pease are six times the price of the pollard, and only three times the weight.

THE

THE TRIAL.

I drew four pigs from my herd, of equal appearance, divided them into two lots, and weighed them alive.

	S.	P.
No. 1. weighed	6	5
2. ———	6	7
3. ———	6	3
4. ———	6	8

Lot 1. contained the hogs No. 1 and 2, weight 12 S. 12 P.

Lot 2. contained the hogs No. 3 and 4, weight 12 S. 11 P.

The equality of these weights is remarkable; but, in an hundred hogs, I do not think my bailiff would mistake two pounds in half a dozen stone.

Lot 1. was confined to a sty, and had eight bushels of pease given them, weight 565 pounds, price 1 l. 12 s.

Lot 2. was confined to a sty, and had forty-eight bushels of pollard given them, weight 1212 pounds, price 1 l. 12 s. Both the pollard and pease were given dry with water in a trough. Each lot was weighed, as soon as the food was done. The result was,

	S.	P.		S.	P.
No. 1. Weighed	19	2			
2. ———	21	5		2	3
Superiority of No 2 is				0	1
Add 1 pound, the first inequality				—	—
			Total superiority	2	4

A single experiment must not be supposed to decide this matter, but future ones may determine it.

EXPERIMENT II

In January 1766, I drew from the herd ten hogs, as equal in size as possible, and weighed them alive in five lots.

No 1.

		P.	S.
No 1	Weighed	13	4
2	————	12	6
3	————	13	0
4	————	12	11
5	————	13	1

A nearer equality than this, in matters that can neither be added to nor diminished, can scarcely be expected.

No. 1. was fatted with white pease, that weighed sixty-six pounds per bushel; the price 30 s. per quarter.

No. 2. with pollard, that weighed twenty-two pounds per bushel; the price 9 d. per bushel.

No. 3. with buck-wheat, that weighed forty-seven pounds per bushel; the price 2 s. 3 d. per bushel.

No. 4. with boiled potatoes, that weighed fifty-four pounds per bushel; the price 2 s. per bushel.

No. 5. with boiled carrots, that weighed raw fifty five pounds per bushel; the price 1 s. 1 d. per bushel.

I thought it best to fix on a given sum, as proper to fat each hog. The people I consulted were of opinion, that eight bushels of white pease were necessary to fat one such hog well. This I accordingly fixed on as my criterion. The account of the expence therefore stood thus:

		l.	s.	d.
No. 1.	Pease, 16 bushels	-	-	-
		3	0	0
2.	Pollard, 80 bushels	-	-	-
		3	0	0
3.	Buck-wheat, 2 bushels	-	-	-
		3	0	9
4.	Potatoes, 28 bushels, 2 l. 16 s.			
	Labour and coals,	-	4	
		3	0	0
5.	Carrots, 49 bushels, 2 l. 13 s. 2 d.			
	Labour and coals,	5	10	
		3	0	0

Each lot was weighed as soon as the food was done. The result was as follows:

No. VII. VOL. II.

Z z

S. P.

	S.	P.
No. 1. weighed	27	6
2. ———	27	9
3. ———	29	13
4. ———	25	7
5. ———	31	0

It is evident from this experiment, that carrots boiled are superior to any other food. I did not expect that potatoes would be so much inferior; but I have found from divers other trials since, that it is requisite to mix the meal of some kind of corn with them. Pollard in this trial, as in the last, is superior to pease.

In January, &c. 1766, having a large number of hogs fattening, I purchased various kinds of food for them, which were given them, some alone, and others mixt together, to discover which fattened them in the cheapest and quickest manner; this being, in the opinion of some, a fairer way of discovering the nature of every kind of food, than the other method.

EXPERIMENT. III.

Seventy-six hogs, from seven to fourteen stone lean, eat in seven days, after nine days fattening,

	l.	s.	d.
17 quarters 5 bushels pollard	5	17	10
1 bushel, beans	0	4	0
7 quarters 2 bushels, pease, ground	10	17	6
3 quarters 5 bushels, or 2 l. 7 s. per diem.			

16 19 4

at 12 Quarts or 1 1/2 Stone each

EXPERIMENT IV.

Eighty-eight hogs eat in twelve hours,

Q. B.	l.	s.	d.
1 6 buck wheat	1	11	6
0 2 pease-meal	0	8	0
1 3 bran	0	5	6
3 3	2	5	0

EXPE.

E X P E R I M E N T V.

The same hogs eat next day, two qrs. of	<i>l. s. d.</i>
white pease, - - - - -	3 0 0

E X P E R I M E N T VI.

The next day, - - - - -	<i>l. s. d.</i>
1 quarter of pease - - - - -	1 10 0
2 bushels of buck-wheat - - - - -	0 4 6
	1 14 6

From this day's quantity, I should think they either did not like the buck-wheat so well as the pease, or the buck-wheat is a much more filling food; but two quarters of pease were the greatest quantity of that food they eat in one day, during the whole fattening.

E X P E R I M E N T VII.

The next day they eat 2 quarters	<i>l. s. d.</i>
of buck wheat. - - - - -	1 16 0

This day's fattening is in some measure a proof that buck-wheat is an agreeable food to them, since they eat as large a quantity as of pease; but they ought to have eat as much more of it, if the proportion lies in the weight and price.

E X P E R I M E N T VIII.

The next day they eat 2 quarters and a half of pease- meal, buck-wheat flour, and pollard mixed, the pro- portion 13 s. 4 d. per quarter.	<i>l. s. d.</i>
	1 13 4

E X P E R I M E N T IX.

The next seven days they eat 22 quarters and a half of the above mixture, at 13 s. 4 d. per quarter.	<i>l. s. d.</i>
	15 0 0

Carry over	15 0 0
Brought	

		<i>l. s. d.</i>
	Brought over	15 0 0
1 Quarter and a half of buck wheat	- - -	0 18 0
7 Bushels of pease	- - -	1 7 0
3 quarters and a half are		
2 <i>l.</i> 9 <i>s.</i> per day		17 5 0

The quantity the hogs eat of this mixture, and their thriving extremely well with it, is a strong proof that the different qualities of the several sorts being finely incorporated in the mixture of their flour, contributed much to the forwarding of their fattening; and the proportions shew that they eat more than when fed with one only.

EXPERIMENT X.

	<i>l. s. d.</i>
The next day they eat	
1 Quarter of buck-wheat - - -	0 18 0
7 Bushels of Pease - - -	1 7 0
	2 5 0

EXPERIMENT XI.

	<i>l. s. d.</i>
The next day they eat	
1 Quarter 4 bushels of pease - -	2 5 0

EXPERIMENT XII.

	<i>l. s. d.</i>
The next day they eat,	
1 Quarter 4 bushels of pease - -	2 5 0
1 Bushel of buck-wheat - - -	0 2 3
	2 7 3

EXPERIMENT XIII.

	<i>l. s. d.</i>
The next eighteen days they eat,	
24 Quarters 1 bushel of pease-meal - -	39 0 0
6 Quarters of barley-meal . . .	7 4 0
1 Quarter 1 bushel buck-wheat flour - -	1 2 6
7 Quarters 4 bushels of polard - - -	2 5 0
1 Quarter of bran - - -	0 5 4
2 Quarters one bushel are	
2 <i>l.</i> 15 <i>s.</i> per day.	49 16 10

The

The difference of two quarters and three and a half, in experiment IX, is remarkable, and seems to prove, that the hogs eat by weight and value, and not by measure: the quantities are very different, but the prices do not vary equally. No. 10, 11, 12, are whole grain, at forty-five pounds per day. This is all ground, and they eat ten pounds a day more; from which I conclude, that the meal fattens much the best.

EXPERIMENT XIV.

The next day they eat, 1 quarter 4 bushels of pease-	<i>l.</i>	<i>s.</i>	<i>d.</i>
meal	2	6	5

EXPERIMENT XV.

The next day they eat, 1 quarter 5 bushels of pease-	<i>l.</i>	<i>s.</i>	<i>d.</i>
meal	2	10	4

EXPERIMENT XVI.

The next day they eat, 1 quarter 7 bushels of pease-	<i>l.</i>	<i>s.</i>	<i>d.</i>
meal	2	18	0

EXPERIMENT XVII.

The next three days they eat, 5 quarters 2 bushels of	<i>l.</i>	<i>s.</i>	<i>d.</i>
pease-meal	8	2	9

1 quarter 4 bushels, is 2 *l.* 14 *s.* 3 *d.*, per day.

EXPERIMENT XVIII.

The next day they eat, 1 quarter 4 bushels of pease-	<i>l.</i>	<i>s.</i>	<i>d.</i>
meal	2	8	0

From all these trials, it appears that the meal is better than the whole grain.

EXPERIMENT XIX.

In January 1768, I confined three hogs to different fyes, and fed them thus,

- No 1. With pease,
 2. — Beans
 3. — Barley,

to see which pork was best and firmest. They were in every respect as equal as possible.

- No 3. The whitest fat, and firm, and well-tasted meat.
 1. The next in whiteness, and equally firm.
 2. Very dark and ill-tasted, but firm.

OBSERVATIONS.

It appears from these experiments, that pollard alone (at the preceeding prices) is a cheaper food than pease alone.

That boiled carrots is much the most profitable food that has been tried.

That buck-wheat is a more profitable food than pease.

That several kinds of food mixed, are better than being given alone.

That the meal of any one, or of various kinds of grain, is better and more profitable than the whole grain, mixed or alone.

That pease and barley are a much sweeter food than beans.

The above experiments are humbly submitted to the Society, not as perfect, but rather as a mark of the Author's wishes to be useful. He shall not be displeased to find, that others have been more accurate and attentive than himself.

ARTHUR YOUNG.

ARTICLE XLIV.

Of Housing great Cattle.

[From MUSÆUM RUSTICUM, VOL. V.]

AMONG the advantages attending the late changes in management of farms in this part of the world, I must rank those which arise from housing of great cattle, by which name I understand cows and oxen.

The practice has long been in vogue with those who had only *one* or a *few* cows; but I remember when those who had many never thought of such a practice with regard to their herds, though they occasionally used it with respect to particulars.

However, the obvious advantages resulting from the method, with regard to a *few* cattle, has induced our farmers to adopt it with respect to *more*; yet it is not so generally followed as it ought, and by many, otherwise sensible men, is even held *problematical*.

I shall therefore, in this letter enumerate all the objections which have been, or can, I think, be made to the practice, give answers to them, and then display its advantages.

The objections to this practice are :

1. " It renders cattle more tender."
2. " It consumes much more fodder."
3. " It requires much more attendance."
4. " It is very expensive in building of houses, leading home of hay, and leading out of manure."
5. " It is wasteful of manure."
6. " It is not so healthy as lying out, which gives exercise."

As to the first, it is acknowledged, that a cow used to the house will suffer much more than one not used to it,
if

if left out of doors. But this method supposes them to be housed from the first colds and rains at the beginning of winter, to the true spring weather, when pastures are broke at *May-Day*; so that this objection amounts only to an assertion, that animals which are used to proper care, will, if neglected, suffer more than such as are used to be neglected; an assertion, which, if it proves any thing, proves that we should neglect all our domestic animals. But to shew the degree of tenderness to which great cattle will be subject by the housing I recommend, I must observe, that all the housing I would wish them to have should be a good cover over head, and a defence from the *northern* and *easterly* winds, and perhaps the *westerly* ones in this country, as they blow cold in spring, when the cattle lose their hair: but I would chuse to have my cow-houses open to the south.

Now, what degree of true hardiness cattle can derive from lying with their sides on wet ground all night, and having their ridges (well known to be tender, and the sources of many maladies) exposed to all the rain, &c. of a whole winter, and their feet and legs benumbed in wet grounds continually, I leave any man of sense to determine.

The generally-wretched condition, in spring, of cattle which have lain out, compared with the good plight of those which were in equal circumstances at the beginning of winter, but have been housed and fed with the same hay, will shew how ridiculous it is to object tenderness to the practice of housing.

White cattle are universally allowed, and, I think, with reason, to be more tender than the *red*, *brown*, or *black*. Now, the breed of cattle in this part of the world is notoriously run into the *white* and *whitish*; so that the argument for housing is much stronger with us, while the breed

continues

continues in this strain, unless we will kill our cattle for fear of tendering them.

As to the second objection, it is acknowledged, that housing consumes more fodder; but then we must consider how far it is a just objection to the practice. Now, it is obvious, that if cattle are to be kept not only *alive*, but *well*, and in condition to be useful in spring and summer, they must have their bellies well filled. The only question then is at present, with what their bellies will be most advantageously filled, whether with *hay alone*, or with *hay and winter grafs*?

Now, any person, who knows any thing of the matter, must acknowledge, that winter-grafs is one of the best manures that can be bestowed on meadow-ground, as it keeps the roots of the grafs much warmer than any other manure which lyes not so compact can do. But winter-grafs having lost its genuine juices, and being in a state of corruption, must be, on many obvious accounts, the worst food which can be given to animals that are to yield milk, or to work in summer, therefore the worst food for cows and oxen: so that he who eats off his winter-grafs, eats his crop of hay for the succeeding year, to fill the bellies of his cattle with bad humours; and if this be a prudent saving of fodder, then is housing of cattle bad husbandry.

I must also here observe, that the quantity of hay trode under foot, spoiled by rain and the dung of the cattle, and scattered abroad by winds, is not inconsiderable; so that if this be added to what lying-out cattle *really eat*, we shall find the difference betwixt the quantities consumed by them and an equal number of housed cattle, not nearly so considerable as may at first be thought.

The third objection seems more specious, but will be found equally inconclusive.

The taking away of the dung from the cattle, the driving of them to water and back again, are circumstances

of attendance avoided, to be sure, by letting cattle lye out; but they are not really very considerable, and abundantly recompenced by other circumstances of attendance which are saved. The man who houses his cattle properly, will contrive to have a pond near his cow-house. To this the cattle will soon go of themselves, and as regularly return.

In the mean time the dung is moved, and the stalls (or boufes, as we here call them) are filled with hay from the neighbouring stack, by almost any boy or woman on occasion. And so much attendance is saved by this practice of housing, both to the milk-maid, who has only to step into an adjoining dry house instead of a wet and distant close, and to the man-servant, who has not his fodder to bear to cattle in distant and wet grounds, and to disperse over these grounds, that it is well known to be one of the first enquiries which both men and women servants make at the time of hiring, “ Whether the master who treats with them houses his cattle ? ” and he who does house them, may always hire servants considerably cheaper than others who do not can; as servants, who know the slavery of attendance on cattle lying out, will hardly hire at any rate to such as do not house their cattle, if they can hire to such as do.

The masters also find so much time saved by the less attendance on cattle housed than those which lye out, that they can even dispense with fewer servants, both men and women, in winter, than they could otherwise; so that the saving of attendance by housing of cattle, may justly be considered as a ballance to the leading home of hay, and leading out of manure.

Much expence of molding is also saved; and cow-dung being only in a state proper for breaking, when neither *very wet* nor *very dry*, the season is often not favourable for this work; and by this means what should *manure* the ground, goes to the fire; as in some counties the *slovenly foolish* farmers designedly convert their cow-dung to this use.

use. *Foolish* I may justly call them, if they can have any other fuel; *unhappy*, if they cannot.

The fourth objection is already in a manner anticipated and answered: for the buildings necessary to answer the purposes of housing of cattle are no ways expensive. Few farmers want a south wall of some kind; against this let them erect a kind of helm of any coarse wood, and wind the eastern and western ends with thorns or furze if stones be scarce. Let them cover it with a few waggon loads of furze, broom, or heath, and if they thatch it slightly, it will last many years. The stalls, as they are kept dry, may be made of any offal wood, and the channel for a conveyance of the urine of the cattle is soon laid with coarse stones. The leading home of hay may be made not very expensive, by putting it in the field into load pikes, and stationing these so that the waggon shall make as few tracts as possible, the picks themselves being made by a single horse's leading in the cocks with a sledge or rather a rope.

As vacant seasons for leading out the manure may be taken, this, though the chief, will be no great expence; and probably the attendance saved in winter and spring will be a ballance both to the expence of leading home hay in autumn, and leading out manure at a proper season; especially if the farmer judiciously contrives to have his meadow ground as near home as possible; and if he cannot have this, his winter attendance on lying-out cattle will be proportionally greater.

But if it should be thought, that the saving of attendance in winter and spring is not an equivalent to the expences incurred by housing of cattle and enumerated in this objection, yet this saving is considerable; and the advantages which I shall enumerate in the close of this letter must be thought to be a great over ballance to any expence incurred by it, in the opinion of judicious men, especially as a cow-house once built stands many years, and a draught has little
other

other work betwixt the autumnal season and depth of winter, than to lead out manure, or, in the hay harvest, than to lead the hay home.

I would have manure led out as soon as the first fog or aftermath is eaten.

The fifth objection is grounded on a supposition, that the manure which is made by housed cattle, when turned out in the day time, is lost. But to this I answer, that the cattle are generally either turned into a yard or field in the day time : in the former case, the manure is easily shovelled up at a proper season and carried out in the same way as the rest ; or in the latter case, it is spread on the ground, where it is made, so that there is little or no loss of it.

Indeed people who agree in the point of housing of cattle, differ in their sentiments about managing of them in the day time ; some keeping them continually in the house, or at least yard, except the time of watering ; others turning them out to graze by day ; and the different circumstances of people will make these opposite methods of management equally prudent.

For instance, where manure cannot easily be gotten, it will be adviseable for people to take particular care of all that is made by their great cattle, as they have nothing else for their tillage. On the contrary, where people have plenty of other manures, and are at a distance from water, it is adviseable to let their cattle wander on to muirs, where they may brouse on the heath or furze, or such like.

This is the constant custom of the inhabitants of all the muirs above this place. They have plenty of lime for their tillage by the coals and lime stone near them, and of manure for their meadows by their turf ashes : They have little inclosed ground, and this they preserve as free as they can in winter ; otherwise the coldness of their situation and lightness of soil, if they eat it bare, would deprive them of all hopes of a crop in the succeeding summer ; their cow-
pasturers

pastures with all advantages, being scarce able to keep their small cows in June.

These people in winter turn their cows into their town street, whence they all march to some common pond adjoining to their commons, where they brouse all the day, and return of themselves at night to their stalls. By these means, with very slender crops of hay, they keep their cattle in very tollerable plight.

As to the last objection, lying out exposes cattle to such colds as produce many distempers, and is utterly inconsistent with their health, except in very favourable winters. But if the farmer really thinks that his cattle want exercise, he may turn them out in the best part of the day into his driest grounds; yet I am myself convinced, that till spring approaches, cattle get much more harm than good by staying out. Standing out is not exercise, and cattle turned out in unfavourable weather stand rather than walk; and cows which lye out, stand too much, unless hunger oblige them to walk in search of food.

I will now very briefly display the advantages which result from the housing of great cattle.

In the first place, by this means the meadows are winter-freed, and the best assurance of a good crop of hay is laid.

In the next place, the injury done to the soil by the treading* of great cattle is avoided.

In the third place, the carcases of the cattle are kept in much better plight.

In the fourth place, the cows give much more and better milk, and longer.

In

* I once saw a small close of very rich soil in this neighbourhood so trodden by very large fat oxen, in a wet winter, that though half their hay was buried under their feet, and the next summer a moderate one, there was absolutely no crop. The oxen weighed about 100 stone each.

In the fifth place, the cows avoid many disasters in calving, and are then attended with great ease.

In the sixth place, the calves are found to be stronger and livelier.

In the last place, the manure is laid on such grounds and parts of grounds, as most want it, and in any proportion, and with any mixture the owner pleases: whereas it is notorious, to the sorrow of every prudent farmer, that cattle lying out, manure chiefly the ground which lye under hedges, and wants it not, and by its irremediable coarseness never pays for that manure.

I must add, that there is no comparison between keeping of oxen in a fold garth, and keeping of them tied up like milch-cows.

For, in the first place, much mischief is often done by the oxen to each other, when promiscuously turned into a fold-yard, and especially to the younger and weaker.

Secondly, They all lye exposed to the wet from heaven, and consequently to the same evils in some degree, as when they lye out.

Thirdly, As the fold-garth is the sink of all their urine, they often lye wet.

Lastly, The waste of straw which is made in a fold-garth is incredible.

Were straw of no other value than to make manure of, the steeping of it thus in the urine of the oxen would be a judicious method; but it may always be made of much more value. When kept clean, the straw will maintain a much greater quantity of cattle; and if there be less manure, it will be better, and there will be much more profit from the carcases of the cattle. I know a farmer, who, last winter, took in four oxen for 20 weeks, at two shillings per head each, that is eight pounds. These were in a fold-garth

garth. I believe it is no unreasonable* supposition, that the straw trod underfoot by these oxen would have kept other two oxen if tied in the stall ; that is, would have given the farmer four pounds more.

P. S. The inconveniencies which attend fold-garths, begin to be now so well known, that a tenant on this estate of a farm of two hundred pounds per annum, who milks above twenty cows, and breeds in proportion, has not a single fold-garth. If they are any where adviseable, it is where a large quantity of beans are grown, the straw of which being scarcely fodder for any cattle, is best wrought into manure in a fold-garth. But even in this case, the straw may serve for bedding in stalls, and the inconveniencies attending all fold-garths seems greatly to preponderate.

A R T I C L E. XLV.

On the benefit of Soap-Ashes as a Manure.

[From MUSEUM RUSTICUM, VOL. V.]

I Do not remember to have seen any thing in your work on the subject of that excellent manure called soap-ashes ; I mean those which are made by the soap-boilers in London.

I have, many years past, received great benefit by using this manure, with which I almost constantly dress my wheat-lands, but never, on account of its hot burning quality, use it alone.

My

* Let the reader consider, that whatever straw is either thrown by the stand hecks, through negligence or incapacity of the fower, or accident, or the wantonness of the oxen being once mixed with the soil, or trod under foot, becomes uneatable, all animals having an aversion to what smells of their own urine. Let him also reflect, how much short straw equally eatable with the rest is lost, and he will probably think that I calculate very modestly.

My method is, to make a large heap of dung and earth, that is, two loads of earth to one of dung, placed in alternate layers to rot. After this has undergone a strong fermentation, I cause the whole heap to be turned and well mixed, leaving it some time longer to mellow.

I then procure the soap-ashes, and mix them with the compost, in the proportion of one load of ashes to ten of the compost, leaving, for some time, the whole to mellow together.

When wheat seed-time comes, about the latter end of September, I cause about ten cart-loads of this rich compost to be laid in little heaps on each acre of the land I intend to sow with wheat: this manure is immediately spread, and, sowing my wheat broad-cast, I plow it in together with the compost.

The advantages resulting from this practice on stiff soils are many; and particularly, if the farmer is in the least careful in preparing his tilth, he will have a clean crop, free from smut or weeds; a matter of no small consequence to him.

I have tried this manure on lighter lands, and find it answer extremely well, provided it has lain a considerable time in the compost-heap to mellow and abate its natural heat; but it agrees best by far with clayey soils, and in such is well worthy of being recommended as an excellent dressing for a wheat crop.

THE
SCOTS FARMER,

JUNE 1774.

ARTICLE. XLVI.
FARMERS KALENDAR.

JULY.

Farm-Yard.

THE compost raised the preceeding winter in the yard being carted on to the land, you may now, if you have leisure, begin to cart in the layer of turf, ditch earth, chalk, marle or clay, upon which you are to fodder the succeeding winter. There is no necessity of performing this work in July; but as it may probably prove a leisure time for the teams, it is mentioned as a business that should be in hand, as a prevention of their standing still. It should be executing from this time till the end of September, as the importance of it is very great, being the source of the most material improvements on a farm, it should be resolved on early, and executed with all possible spirit.

Turnips.

Now you must hand-hoe your turnip crops; a work perfectly understood in many parts of the kingdom; but so much neglected and unknown in others, that it will be proper to enlarge a little on the method of performing it, and on the necessity of the practice.

Supposing turnip-hoers to be scarce, or to demand ex-

travagant prices, or none to be had, order some hoes to be made by your blacksmith, the iron part exactly 12 inches long, and three or four broad, nearly done and sharp: put handles five feet long in them. So provided, take your men into the field, and yourself with a hoe should accompany them, make them hoe the crop boldly, and not be afraid of cutting too many up: direct them to strike their hoe around every plant they leave, and fix upon the most vigorous and healthy growing ones. By this means, they will not be able to leave them less than fourteen inches asunder; for their hoes spreading at every cut twelve inches, they cannot spoil your crop by not cutting freely. This work must be done by the day, and you must attend the men well, to see that they cut the land pretty deep, so as to kill all the weeds, and also such turnips as they strike at. In about a fortnight after, send them in again to rectify former omissions: in which time they must break all the land again with their hoes, cut up the remaining weeds, and, wherever the turnips were left double, thin them. The men will be awkward at this work the first year; but by degrees they will be able to do it in perfection, and by mixing new ones among them every year, the art will not be lost.

In countries, where turnip-hoeing is commonly practised, the work is generally done by the piece: four shillings an acre for the first hoeing, and two shillings and sixpence or two shillings for the second, are common prices. Where this is the case, the farmer's principal attention should be to see that the work is well done; for in all these operations, the fellows are extremely apt to run over their work in a slovenly manner, aiming only at making good earnings: The farmer should see, that they cut up all the weeds, and leave the turnips every where single. The crop must have two hoeings, which should leave it perfectly clean, and the plants all at regular distances.

Cabbages.

Cabbages.

The crop planted in April or May, must be looked to this month ; as they were both hand and horse-hoed in June, perhaps they will not want any more culture till August, but this depends on the season ; if the weeds grow let them be killed ; for the best rule in this matter is to hoe sufficiently, to keep the crop perfectly clean, and to horse-hoe whenever the intervals are at all bound by rains or otherwise.

The crop planted last month must be hand-hoed before the middle of this ; in which work you should be attentive to cut up all the young weeds that grow near the plants, and break all the land on the tops of the ridges ; but the men need not hoe the sides of them, or the furrows, as the plough in horse-hoeing will cut them much better. Some fresh earth should also be drawn to each plant, earthing it up as it were. The first horse-hoeing should be given soon after ; in which operation, the plow should take off a furrow from the ridges on each side, and throw up a small ridge in the middle of each interval, which will let the sun into the earth, on which the plants stand, and pulverize and sweeten it. The cabbages will be left on a narrow slip of earth ready for the second hand-hoeing, which will be given with great ease.

Potatoes.

The crops of potatoes, planted in rows, must have a third horse-hoeing this month. The common way of plowing backwards or forwards every time of horse-hoeing is not well adapted to this crop ; for cutting the roots, when the plants are in full growth, hurts the crop, you destroy runners, that would produce potatoes. For this reason the third horse-hoeing should be given first with an instrument, called a cultivator, of which there are very many sorts, but they

they all agree in the circumstance of cutting and loosening the earth, without turning it over, or forming any ridge. Some of them work with many little triangular shares, some with single flat ones, and others only with coulter; but any of them that cuts up fresh moulds at the bottom of the furrows, will answer the purpose. A double mould-board plough (a common instrument in some counties) should follow the cultivator in about a week, and striking the furrows, throw up all the loose earth against the ridges, banking them up. There is a great use in this operation; for it throws up fresh earth for the roots to shoot into, which is preferable to taking it away from them, after they have advanced at all in growth.

Lucern.

The drilled or transplanted lucern will be ready to cut again this month, the intervals must be directly horse-hoed the contrary way to the last. In respect to hand-hoeing, the best rule will be, to do it according to the growth of weeds. There is no necessity for it while the rows continue clean; the weeds that arise among the plants in the rows should be plucked out, and particularly all grasses, which are the greatest enemies to this crop.

Mow Grass.

All meadows and pastures not mown in June should be cut this month. Hay making being in many seasons such ticklish work, and so extremely expensive, the farmer should take care to manage it with as good contrivance as he can. To have a plenty of hands is a material point; for, if good use is not made of favourable days, the work will certainly be unprofitable. In order to this, the farmer should have some other work always in readiness for his people, in case the weather is too wet for hay making. For
men,

men, he may have compost hills to turn over and mix, borders to grub or dig up, carting manure, &c. Women he may employ in stone-picking, weeding, &c. When many hands are kept, this management will save much useless expence. In the making the hay, the getting it at last on to the large cock should never be omitted. Many farmers only run it up in broad rows, and load from them on to the waggons; but it is better to employ all the hands in cocking it; for if the cocks are large and well made, the hay will take no damage in them, even in very heavy rains; and by all the men being so employed, much the more hay will be secured. Where the labourers will take the work of hay making by the piece, it is adviseable to put it out to them at so much an acre: for instance from five to eight shillings, for mowing, making and cocking.

The Teams.

All this month the horse and ox-teams should be soiled daily with lucern in the houses or yards; but if in the latter, they must have water always at command, and also shades for shelter; and if the farmer does not provide plenty of litter for treading into dung, he neglects the principal part of his profit. Lucern is the best plant for this purpose, and an acre of it will go much further than of any thing else. Sainfoin is good, so is clover; and tares mown every day will answer well in the same use; in want of these give natural grass: but any of them are better with plenty of litter for dung, than turning the horses or oxen into the field. However, if litter is not kept in plenty, then it is much more adviseable to turn out.

The Fallows.

Have an eye to your fallows this month, and do not follow the example of those farmers, who totally neglect them

them for works of hay and harvest. A farmer carries on his business very unprofitably, if he does not keep men and horses enough for all works: it is unpardonable to suffer the fallows to be over-run with weeds at this time of the year: they ought to be in a fine state of pulverization.

Some excellent husbandmen, on very stiff tenacious clays, that run much to couch and twitch-grass, assert, that the fallows ought to receive the second plowing the beginning of June as deep as possible, which leaves the field all in immense clods; these should roast in the sun until the end of August at least. They assert, that such management kills all couch and twitch, which would vegetate and encrease infinitely, if the land was made fine before the heat of summer came on. But there are many objections to this plan, supposing the fact true of its killing the couch. You lock up all the seeds of weeds in the clods, at the same time that you destroy the couch; so that on sowing your wheat, before which the land is made much finer, they all vegetate with the crop. Another very great objection is, so much of the soil losing the benefit of the sun's acting on it, during the hottest of the summer months. If the land is really improved by the air in summer, sweetened, ameliorated, or any ways enriched, sure'y it must be in proportion to the number of particles exposed to its influence. The sun penetrates deep in well pulverized soils, but has little effect in clods as hard as marble. These observations are not offered as proofs, that the above mentioned farmers act absurdly; for on certain soils, not very general, their practice may be just: but I think that such opinions should, by no means, be generally adopted on all stiff soils, for the result might then turn out very disadvantageous.

Folding.

This month folding should be followed with unremitted diligence; the lands usually fixed on for this purpose, are

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the wheat fallows, which is very judicious in those farmers, who have no crop sown between, or turnips and wheat, and who cultivate no grasses in the horse-hoeing way; but let the attentive accurate husbandman lay it down as a rule, ever to fold those lands first, which will be first sown or plowed. During this month, he should fold such fields as are destined for August, sown grasses of whatever sort, or lucern plantations, just cut, and ready to be horse-hoed: By these means the crops are immediately benefited by the practice; but if the manure is left above ground, to have its virtues extracted by the sun, the benefit reaped by the crop, will not be near so considerable.

Dig Manures.

Do not let the marle, chalk, mud, or clay carts stop this month: it is a very proper season for the work, and should be pursued with spirit while the season admits it on all soils: I say, on all soils, because in winter, wet or heavy ones must not be carted on. These manures, though expensive at first, are cheap in the end, for they last many years. In all works of carting, attend particularly to the employment of your team; use as few horses as possible. For this purpose, the small three wheeled cart is excellently adapted: one horse is sufficient for two of them: one is loading while the other is driving away, by means of the third wheel, which supports the weight of the cart and load, instead of the fill-horse in large carts: they do not hold more than fifteen bushels, and the wheels should be nine inches broad: a great excellency, as such will do for winter-carting on grass-lands, without poaching or otherways damaging the grass. If the draft is not distant, four or five men will thus be employed by one horse, which is an excellence that no other machine can boast. Now, let any attentive cultivator reflect on the importance of an odd horse performing all the carting of a farm, while the others are going regularly on with their tillage, or road work. Whoever will consider this

this comparison, in the proper light, will be sensible, that it is much the most œconomical way of carrying on business.

Barley.

Some of your barleys will probably be ready for mowing towards the latter end of this month, particularly the Fulham sort, which is frequently cut the middle of July, a fortnight before any other sort, though sown at the same time, and on the same land. This early mowing has several advantages, many weeds are cut before they seed, which, in a fortnight longer, would shed, and consequently injure the ensuing crops. The trouble and attention of harvest is lessened; for a part, at least of the barley crop, may be in the barn, before other farmers, who do not use this sort, begin to mow.

Wheat.

August is the principal month for cutting wheat, under which head I shall treat of it more particularly. I mention it at present, merely to consider the conduct of many sensible farmers, who are fond of cutting their wheat, at least ten days before it is absolutely ripe. There is reason to think this practice a very good one; the corn is left in the field longer than common, to finish in that manner the ripening: The advance is the fineness of the grain. If you are desirous of carrying to market a sample of wheat, that shall exceed all others, it must be thus harvested; and I have more than once heard several very attentive farmers assert, that they lose nothing in measure by this management. It is at least worthy the trial of all good husbandmen, were it only for the convenience of somewhat dividing their harvest. The last fortnight in August is so busy a time, that many of them scarcely know how to get in their corn, upon account of all sorts then requiring attention at once.

ARTICLE. XLVII.

Of the culture of Flax or Lint.—Of the culture of Hemp.

[From DICKSON'S AGRICULTURE.]

THIS plant, though very different in its uses from those that have been mentioned, yet falls within this class, as the stalk is the principal part of it, and as the principal use of the seed is to produce the plant. Though it is not proper for food either to men or cattle, yet a good crop of it is perhaps as valuable as any crop whatever.

Great encouragement has been given by the government for the culture of this plant, yet it has not made very great progress. A very small part only of what is manufactured in Scotland, is raised in the country. We are provided chiefly from Holland and Russia at a very great price. Whether or no the demand has lately increased much, or whether any other cause can be assigned, I know not; but it is spoke of as a thing certain, that the price of lint has in a few years advanced near 50 per cent.

I am at a great loss to assign a reason for the small progress that the culture of this plant makes in Scotland. Premiums in different shapes have been given. They have been given to every farmer, that raised one acre and upwards; for every acre that he raised, a certain sum. They have been given to persons for purchasing a certain number of acres, and manufacturing the produce of them. They have been given to persons for the erection of mills for dressing lint, to lessen the expence of manufacturing: and they have been given to the persons that raised the greatest quantity of green lint upon the acre.

It is no part of my province to attempt to assign the reasons that have prevented the culture of flax, notwithstanding

ing all these encouragements. I must however observe, that it is a very great disgrace upon our country, that when encouragements were offered, men should be found, who, instead of studying to deserve them by vigorous attempts to promote the culture of this plant, should only contrive how they might gain them by fraud, and that they should find persons in a higher station so easily imposed upon as to attest their frauds as facts.* It is certain, that certificates were produced of crops of lint of value far superior to any thing that has been mentioned of lucern; and I may almost venture to say, of twice the value of the land upon which it was raised. I mention this, because I think it is the duty of every man, when encouragements are given to industry, to prevent, as far as he can, the public from being imposed upon, that so the good end proposed may not be frustrated.

I must observe likewise, that there is little ground to hope, that any plan for this purpose will succeed, unless some method can be fallen upon to make the raising and manufacturing of lint two different employments, carried on by different persons, fitted for each part, and properly situated for the business. Every person that knows the various operations necessary to be performed on lint, must soon be convinced, that the raising it in the field, and preparing it for the cloath manufacturer after it is raised, are very different employments, and should be carried on by different persons. At present the whole is carried on by one person: and this person is either almost entirely unacquainted with agriculture, and is obliged to hire the necessary labour at the greatest expence; or if he is acquainted with agriculture, and can raise the crop of lint at the smallest expence; yet having already a great deal of other important business,

* The trustees are so sensible of these frauds, that they have not continued to offer the premiums.

business, he cannot think to give himself much trouble with any work, that interferes in any degree with his chief employment. Yet this the farmer must do, if he engages with lint. The pulling, watering, and grafting interfere with the most important business of the farmer, the making his hay, and the cutting down and ingathering of his corn. This makes him averse to meddle with lint; and if he should engage with it, makes it impossible for him to give that attention to it, that some of the operations mentioned require.

While matters then continue to be carried on in the way they are at present, I am afraid that the culture of flax will not make great progress. But could persons be found for purchasing lint upon the ground, and could habitations be assigned them in proper situations, so that they might, by water-carriage, or some other easy manner, bring home the lint from the different parts of the country, to be watered and grafted immediately under their own inspection; there is reason to believe, that the farmers would raise as much lint as should be found necessary for our manufactures, or would be proper for their land to carry.

When premiums were given to persons for purchasing a certain number of acres, and manufacturing the produce of them, something of this kind was attempted; but then no care was taken in the choice of the persons to whom these premiums were given, or to have them properly situated for their business.

The scheme at present proposed of making a canal betwixt the Forth and Clyde, offers an opportunity to promote the culture of lint in the manner here mentioned †. It is proposed, that this canal shall pass through lands, that at present produce the best lint in Scotland; and by forming it,
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† This was written before the act of Parliament, for making this Canal, was obtained.

and providing it with water, some other lands, at present lying wet, may be rendered proper for this purpose. Habitations for lint manufacturers may be made in some convenient places on the side of the canal, to which green lint may be brought by water-carriage from any of the lands that lye near to it, or even on the sides of the friths at a small distance from the ends of it. By this means, tho' the lint may be raised at a considerable distance from the purchaser, yet he can bring it to his habitation at a small expence, and have it watered, grassed, and dressed, immediately under his own eye. If there is the smallest probability that such a scheme may take place, it would be proper to put a clause in the canal bill, to allow all green undressed lint to pass free from toll.

It is probable, that on the sides of some of the lochs in the west Highlands, proper habitations may likewise be found for lint manufacturers. The climate is very proper for lint, and the soil in some places may be found proper for it also; the land is generally low rented, and the navigation upon the lochs will enable the manufacturer, at small expence, to bring to his habitation the lint that he purchases even at a distance.

If a manufacture of this kind is established by a society, encouraged by the public, though it may not succeed at first, yet it will point out to private persons how they may carry it on afterwards to advantage.

But though the farmer may not receive this encouragement, it may not be amiss to give some directions about the culture of this plant.

The first thing to be considered, is, the soil that is proper for it: Where land is in constant tillage, there are not many soils on which it will succeed. The one most proper is a deep, moist, rich soil, made as free from weeds as possible: Land newly broke up, though it is not so good,
answers

answers very well, provided it is deep, and not too dry.

The farmers in Scotland have seldom been at any pains either in the choice or preparation of their land for a crop of lint. They seem always to have considered it as a crop, upon which very little depended, and therefore have been always less anxious about the success of it, than of any other crop. Were they at as great pains to prepare their land for a crop of lint, as they are for a crop of wheat or barley, they would undoubtedly succeed : But the uncertainty of a market for it upon the ground, the trouble it occasions it obliged to dress it themselves, and the length of time before they receive a return, prevent them from sowing it upon good land, or being at much expence in its culture.

Such is the nature of the crop, that it merits to be raised on land prepared by a fallow. If the land is not fallowed, it should be in good order, and receive a plowing before winter, that so it may be properly mellowed by the frosts. Upon this winter-furrow the seed may be sown if the land is very clean ; if not, it should get a second plowing at seed-time. When lint is to be sown upon land newly broke up, the land should likewise be plowed before winter, that so the harrows may be able to break the turf compleatly. Unless this is done, a good crop cannot be expected. However, one plowing in this case is sufficient ; for if the land is in good order, and there is any frost in the winter season, the turf will be easily torn in pieces by the harrows.

In sowing, the lint must be treated like grass-seeds. The land must be harrowed, and well smoothed before the seed is sown ; and then another slight harrowing given to cover it. All the clods must be well broke, and all the stones gathered off, that so the seed may come up the more equally.

The proper time for sowing is in March, or in the beginning of April ; and about 12 Linlithgow pecks, barley
measure

measure, is the proper quantity for an acre, adjusted according to the situation of the land. The richer that the land is, provided it is not too open, the greater quantity of seed in proportion should be sown. Lint in this respect is very different from corn. In sowing corn, the richer that the land is, the less seed is required; because the richer that the land is, the greater number of stalks come out from the root. But in sowing lint, the richer that the land is, the more seed is required, because one grain of seed produces no more than one stalk, and the richer that the land is, it is able to nourish the greater number of stalks. Besides it is found, that the thicker the lint grows, provided it does not lodge, it is always of the better quality.

If the land intended for lint has been in tillage, though great pains may be taken to destroy the weeds before the lint is sown, yet so many will rise with the crop, as to render it necessary to pull them out. This is commonly done by the hand; and, though expensive, may be done without any danger. The English writers on Agriculture propose to turn in sheep upon the lint, and they assure us, that if this is done at a proper season, they will eat up the weeds without doing any hurt to the lint. But I am persuaded, that sheep are unskilful weeders, and though they should do no hurt to the crop of lint, would not sufficiently destroy the weeds. It is a little surprising, that the authors of the compleat body of husbandry should think, that this method in some cases will do very well, when at the same time they condemn the ordinary method of pulling out the weeds by the hand. But notwithstanding what they alledge, yet there is no danger in going amongst the lint, and even sitting down to pull out the weeds if necessary; for though the lint should be even more than three inches long when laid down, yet it rises again in a few days.

Mr Tschiffeli says, that lint should be weeded when it is
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four inches high, and that there is no danger of its being damaged, that the weeders should always go bare-footed into the field, and should work as much as possible sitting or lying down. In Scotland, they sit upon their knees, as the posture in which they can most easily move forward.

There is nothing in the culture of lint that we seem to be less acquainted with, than the proper time of pulling it; yet it is certain that a great deal must depend upon this. When lint is intended for seed, it is easy to know when the seed is ripe; but at what time the stalk has the greatest plenty, and the best lint upon it, is not so obvious. When treating of the culture of the different grasses, it was observed, that the stalks of grass become worse, and contain less nourishment, in proportion as the seeds are advanced. There is reason to believe the same thing with respect to stalks of lint, that the further that the lint seed is advanced there is the less lint.

Perhaps it may be necessary, that some of the juice be extracted from the lint, to give it proper strength. Was it not for this, which may be true, though not very probable, I should recommend to pull the lint as soon as the flower has fallen, as the time when there is the greatest plenty, and the best lint upon the stalk; it is certain, that it ought not to stand long, for it is known to be the practice, in those places where they have the best lint, to pull it before the seed is compleatly ripe. This practice serves another good purpose; the land is not so much exhausted by the crop, when the lint is pulled soon, as when it is allowed to stand and perfect its seed. Some regard should be paid to the land in determining the time of pulling. It is certain that lint is a very severe crop, and requires as much nourishment as any crop raised in our fields. When the land on which it is sown is rich, and full of weeds, there is commonly a good crop of barley after it. By the crop of
lint

lint the weeds are destroyed, and the crop being early taken from the fields, the land gets a kind of summer fallowing. This has led some into the opinion, that lint is not hurtful to land. but those farmers that have made the most frequent trials, are now fully convinced of its severity.

The opinion that lint is a severe crop is agreeable to what the antients write concerning it. Virgil says, that lint burns the soil. Collumella says it must not be sown except it brings great encrease, and the price it bears invites, for, above all other seeds, it is hurtful to lands.

However, in land proper for lint, the farmer may sow it in a course with other crops, and in disposing of his crop he may sell it a little the cheaper the earlier that it is to be pulled, for when the lint is early pulled, he may expect the better crop after it.

Of the Culture of Hemp.

Hemp is of the same nature with lint, only much coarser and stronger; and wherever there is shipping and a foreign trade, there is great demand for it. There is very little of it raised in Scotland. Whether our soil is not proper for it; whether we are unacquainted with the culture of it; or whether we have not as yet learned the proper way of dressing it, I shall not pretend to determine.

Hemp is a plant that was cultivated by the Romans. Collumella says, that it requires fat, well dunged, and well watered ground; or that which is flat, moist, and manured very deep. He adds, that it was sown in the month of February at the rate of six grains upon a foot square. Hemp pushes down one large root, and therefore requires a deep soil. It is obvious from its appearance, that it takes a great deal of nourishment, and therefore requires likewise a rich soil.

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The season for sowing it, is in the first of April, and, in sowing, it must be treated like lint. The land must be well harrowed before sowing, get a slight harrowing after, for covering the seed; the clods must be well broke, and the stones carried off. As the seed is sown thin and not covered deep, and as birds are very fond of it, it becomes necessary to watch it till it begins to spring.

There are two kinds of it called the male and the female, which grow promiscuously from the seed that is sown: one of these only carries seed. The one that carries no seed is much sooner ready for being pulled than the other. This occasions great difficulty in pulling. For when the two kinds stand promiscuously on the field, it is difficult to pull up the one kind without doing much hurt to the other. This has made some persons propose horse-hoeing as the proper culture for this plant. For though it is a tap-rooted plant, and has only one stem like the lint, and cannot be supposed, for that reason, to receive very great benefit from the horse-hoeing culture; yet the alleys allow what is early ripe to be pulled up, without doing any harm to that which is allowed to remain, and the horse-hoeing must occasion a very great encrease of seed.

Whether or no the kind that carries the seed would produce a larger quantity and better hemp, if pulled up before the seed is ripe, is an important question, and may be determined by proper experiments. If it is found to do so, then both kinds may be pulled, when the earliest or male kind is ready. A small quantity may be allowed to stand for seed, which I am persuaded, that, by proper culture, may be made to produce as much seed as is raised at present from a very large quantity by the ordinary culture. However, with respect to this, nothing but conjecture can be offered till proper trials are made.

ARTICLE XLVIII.

Advantages of cultivating Flax;—and Directions for the management of that most useful vegetable.

FLAX has been held in the highest esteem from all antiquity, being celebrated as one of the great staples of Egypt, and from the manufacture of which, arose one of the most lucrative branches of her commerce. It is thought to require a very deep, rich, and warm land; but we know from experience, that, with proper skill and attention, it will thrive exceedingly well in almost every soil throughout the British islands. It is indeed true, that the ground which is to produce flax, ought to be several times carefully plowed, so as to render it perfectly fine; and must then be laid as smooth and even as possible. It may be sown about three bushels on an acre, in the first warm weather after the middle of March; and, if rain succeeds, it must be kept free from weeds till it rises about two inches high. In some places they have ventured in this state to feed it with sheep, and this without prejudice. It is ripe somewhat later than hemp, and when ripe is to be pulled as expeditiously as possible, and then laid in small parcels, evenly, with the head towards the South, that it may dry conveniently. It affords after this a great deal of employment, in watering, pulling, breaking, &c. which is certainly an advantage, as it supplies labour, and of course subsistence, to many poor people; and, when all this is done, is seldom less than ten pounds an acre. But when we consider the benefits that arise from the commodity when it comes into the hand of the manufacturers, and the multitudes that get their bread by spinning, weaving, and bleaching in it; it must appear to be a national object of the greatest importance; and the more so, as there is not a probability only, but a certainty, that, with proper encouragement

couragement, it might be made as much a British staple as wool. On this account it deserves, and surely the time is not far distant, when it will meet with the utmost attention, the only thing requisite to put it effectually in our possession.

It is owing chiefly to some ill founded prejudices, that it is not already so; and a greater service could not be rendered to the public, than by removing these prejudices, not simply by arguments, but by experiments, which would put the fact entirely out of doubt. The Dutch, who understand both the culture and manufacture of flax better than any other nation in the world, prefer their own seed, raised on the stiff clays of Zealand, to any that they receive from the northern parts of Europe; though they also drive a great trade in this. But the flax employed in their manufactures grows on a light, warm, gravelly soil, and owes its beauty and fineness to their sedulous care in manuring, cultivating, making it properly in the field, and in the dressing it afterwards. They likewise carefully guard against an error into which we frequently fall; which is, the pulling the flax too green, by which, in the first place, the seed is lost, and, if preserved, is of little value, in respect to the producing another crop. The occasion of this error was the fairer appearance of flax, when thus pulled, than when suffered to stand longer. But this advantage was simply in appearance, since the green flax loses more in the dressing, and has never that strength in the thread, which it would have if pulled in a more mature state. We have the same diversity of lands, and much more of them, than the Dutch; and therefore, if we took equal pains, there is no reason to doubt, that we might succeed as well as they; and that, by changing our own seeds, we might be released from the necessity of importing them, as well as flax, for our own use; and, when the consequences of this shall be duly considered, there is very little room to fear, that every obstacle may not be overcome ---

A R T I-

ARTICLE. XLIX.

An ESSAY on the MANAGEMENT of HOGS; including Experiments on Rearing and Fattening them: By
 ARTHUR YOUNG Esq;

[Continued from p. 363.]

IN addition to the former experiments, I shall add a few that have been tried since.

I.

In January 1766, twenty pigs, that had been weaned six weeks, were draughted into four parcels, and kept for three weeks upon the following articles of food ;

- No 1. Boiled carrots.
- 2. ———parsnips.
- 3. ———red beets.
- 4. ———potatoes.

They were then viewed, and the result :

- No 1. The best.
- 2. The next best.
- 3. The next ; very near equal to No 2.
- 4. The worst, but very good.

The difference between them but little.

Carrots, in this trial, appear to be superior to the other articles——but not so much as to prove decisive.

II.

In February 1766, drew six lots of pigs, four in each—the equality very exact ; and, confining them to separate sties, fed them in the following manner three weeks :

- No 1. Raw carrots.
- 2. ———parsnips.
- 3. ———red beets.
- 4. Raw potatoes.
- 5. ———Jerusalem artichokes.
- 6. ———Turnips.

At the end of that time viewed them ;

- No 1. The best in good order.
- 2. — 3. Next ; equal : these also in good order.
- 4. and 5. The next ; equal.
- 6. Three dead ; and the other dying.

Carrots,

Carrots, parsnips, and beets are excellent food; potatoes and artichokes the same, though in a somewhat inferior degree: turnips wretched.

III.

In January 1767, drew three lots of weaned pigs, and fed them a fortnight as follows:

- No 1. With boiled carrots.
- 2. ————— parsnips.
- 3. ————— beets.

Viewed them at the end of that time; the result,

- No 2. The best.
- 1. The next.
- 3. The last.

But all in good order. Parsnips, being superior in this trial to carrots, contradicts, so far, the result of the former experiments; but a few trials must never be considered as decisive. In all agricultural ones, the general averages are the points alone which carry conviction.

IV.

The 6th of January, 1767, confined six pigs, two months old, to a sty, and fed them for six weeks with nothing but boiled Jerusalem artichokes, and the common wash that is given to lean hogs, as a trial to discover how far that root may be depended on for feeding such pigs. The result was favourable; at the end of the time they were viewed, and found to be in good order;—not so well looking, as I have often had such pigs kept on other meat—but well enough to shew that this food is a matter of much importance.

V.

Sowed common red clover with barley in the Spring of 1765, on two acres of wood-cock, brick-earth loam, on a clay bottom, that yielded beans, horse-hoed in 1764. In October 1765, manured it with thirty loads of compost, consisting of various proportions of farm-yard dung, town-manure, turf, ditch earth, &c.

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The fences around it were well repaired in the winter; and one, much worse than the rest, new made. The 12th of May I turned in thirty head of swine, consisting of sows, large pigs, and hogs half and three-fourths grown: they took immediately to the clover, and in about a fortnight, all discovered by their looks how well the food agreed with them; there was a pond in the field, at which they drank perpetually, and of nights they laid all of a heap in a corner of the piece; under a thicket of bushes; not making any attempts to get home, after walking the first evening once or twice around the border with that design. Finding that stock of hogs insufficient to keep down the clover, more were added; and some kept in the piece till Michaelmas. The account of the expences and produce is as follows.

Expences.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Seed - - - - -	0	10	9
Sowing - - - - -	0	0	6
Manuring, at 20 <i>d.</i> a load the manure, and the expence of carting it to the field - - -	2	19	4
	3	10	7
Rent - - - - -	1	14	0
	5	4	7

Produce.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Keeping 15 hogs 21 weeks at 3 <i>d.</i> - - -	3	18	9
Ditto 12 ditto 12 weeks at 3 <i>d.</i> - - -	1	16	0
Ditto 10 ditto 16 weeks at 3 <i>d.</i> - - -	2	0	0
Ditto 5 ditto 10 weeks at 2½ <i>d.</i> - - -	0	10	5
Ditto 12 ditto 10 weeks at 2 <i>d.</i> - - -	1	0	0
Keeping 10 hogs 12 weeks at 1½ <i>d.</i> - - -	0	15	0
	10	0	2
Expences - - - - -	5	4	7
Profit, 2 <i>l.</i> 7 <i>s.</i> 9½ <i>d.</i> per acre.	5	15	7
	From		

From the event of several other fields of clover this year, I am clear that no other use of it would have paid better than thus feeding it by hogs. A clear profit of forty-seven shillings per acre, after paying the expence of a good manuring, is considerable, and greatly preferable to the general profit by hay, the chance of seasons taken into the account. Nothing can be clearer than the fact of hogs thriving excellently on clover—all these swine grew very fast, and shewed by their looks how well the food agreed with them; and there is no animal that sooner falls off in its appearance than a hog, when badly fed. Where therefore is the necessity of providing other summer food? Why consume that food for those hogs which clover will maintain, while sows and pigs, and weaned pigs, cannot be kept without it, such as dairy-wash, &c.

This is a system of management that will enable the farmer to keep much larger stocks of cattle than the methods yet common in so many counties.

VI.

In the Summer of 1767, kept as many hogs of various sorts in one acre of clover, sown with oats after turnips, on a good gravelly loam, as came to 4*l.* 8*s.* at the above prices. The hogs were in it from the last week in May to the middle of September, never at home. They throve extremely well, and no swine could look better.

These trials, with many others, prove incontestibly, that clover, well fenced in, with a pond in the field, is to be absolutely depended on for the Summer-food of hogs, without any assistance: and that such an application of the crop will pay as well, and probably better, than any other.

ART I-

ARTICLE. L.

A short and easy Method of Making Hay to the best advantage.

IT being a duty incumbent upon every member of society, to communicate his discoveries for public benefit, I shall make no apology for sending you an account of my own practice of making hay, by which I not only save one third of the time and labour usually employed in this article, but have my hay made better than when I followed the usual method.

I mow my grass, and then let it lye in the swarth till the dew is off the next morning, at which time I turn and spread my hay, and let it lie in the sun till the after part of the day, when I take it up and cock it well, and never meddle with it more till I cart it into my barn, or stack it. If the weather be good, it will do well to cart, after it has stood three days in the cock.

This method, I have found, by five or six years experience, answers for any sort of hay, except salt hay, and red clover; of the latter of which I have not had so long trial; but my clover hay was managed last summer in the following manner:

I followed my mowers as they cut the grass, spread it as thin as I could, and before night put it in cock. The next day, after the dew was off, I spread it again; in the afternoon I cocked it a second time, and meddled no more with it till I carted it.—The appearance of the hay since makes me judge that no man has better of the sort.

The reason why I think my hay rather better, is, because I take it for granted, that the more juice, or natural moisture, we can retain in it, without corrupting and rotting the stalk, the richer and more nourishing it is. The too often turning and spreading hay in the sun extracts too much of the richness thereof, and one day's thus lying will

take away such a quantity of the moist watery particles, as that the remainder is only sufficient to raise a proper fermentation thereof when in the cock, while the smallness of the body there keeps that fermentation from rising to such a height as to corrupt it. After twenty-four hours, the fermentation will gradually abate; and the pitching of the hay into the cart, and afterwards into the mow or stack, so checks it, that it will not again rise so as to be detrimental. Cattle are fonder of this hay than of that which is made in the common way, and less of it will support them.

Doncaster.

J. W.

ARTICLE II.

Observations on the proper time of Sowing Barley.

[From Mr ARTHUR YOUNG's experimental Agriculture.]

OUR correspondent RUSTICUS, having (p. 305.) requested us to furnish our collection with extracts from Mr Young's experimental agriculture; and at same time sent us some of the notes he had taken from it, particularly, the average products from sowing barley at different times; we cannot more properly at present comply with his request, than by inserting Mr Young's observations subjoined to these experiments, which are as corollaries, deduced from them, to be applied to practice.

The average product from sowings in February is $12 \frac{1}{2}$

March	-	-	-	-	-	$11 \frac{1}{2}$
April	-	-	-	-	-	$8 \frac{1}{2}$
May	-	-	-	-	-	6
June	-	-	-	-	-	$3 \frac{1}{2}$

I apprehend it will not be thought easy, even to conceive any thing more decisive than this little Table: The reader

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doubtless

doubtless knows, that the proportions of these sums are the point of importance : instead of ounces call them bushels, sacks, or quarters. When a June sowing yields three and a half sacks, a February one will yield twelve and a half, and so on. But I should observe something on such very early sowing of barley as the month of February, because it is very contrary to all common practice.

These experiments include both a gravelly and a clayey loam ; farmers in general occupy all kinds of soil, from dry sands to excessive wet clays : the variations of soil, relative to the time of sowing, must never be forgotten. February here appears to be the most beneficial season ; but need I observe, that there are many soils which will not admit stirring so early as February ; others that will not admit it even till April, without the management is previously concerted with such a view ; and that there are some seasons in which no plough can stir in February : All these points should be considered. There is nothing which opens a way to error more than general maxims : Exceptions are always so numerous, that they are nearly destructive of such rules. The cases in which barley should be sown so early as February, may, I apprehend, be gathered from naming a few : First, When the weather is dry enough to plow the land without the least poaching : This is relative to all sorts of Soil. Second, Upon those dry, sound, crumbling clays, whether natural, or artificial through draining ; that by being thrown on to the ridge in autumn, will be ready for plowing very early in the spring : These soils yield of all others the greatest crops of barley. Third, upon all dry gravels, sandy loams, &c. that admit plowing during most of the winter. In these circumstances, and similar ones, it appears from the preceeding experiments, that it is advisable to sow so early as February : Bad weather, such as frosts and snows, succeeding the sowing, are no objection : No weather could be worse than many weeks after several
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of the preceeding seasons; nor have I ever perceived, that the corn suffered. Most farmers who live in countries where it is the custom to sow early, must by chance have known their barley fields frozen, or covered with snow, and that without damage. There may certainly be excessively sharp frosts without snow, just as the barley is appearing above ground, that may possibly injure it: I will by no means assert the contrary, but I have never observed it.

But advantageous as very early sowing undoubtedly is, yet there are some wet undrained clays, loams, chalks, &c. that will not admit it; and there are numerous farmers that are in a tract of management which excludes it. Land that is to be sown in February, or even March, must have its tillage before that time: it is absolutely requisite to plow and sow immediately in the spring; that is, to give no preparatory spring plowings: for soils which are apt to be the least moist, will, after one or two spring-plowings, become absolute mud, with every heavy shower of rain: and this will be in proportion to the degree of pulverization: consequently the farmer has the best chance of a dry stirring the first: as rains, which afterwards would make the soil poach, will, before it is stirred, have no such effect. I have often been caught with rains, in my spring preparation for barley, and yet oftener observed it among my neighbours, and the consequence is always a very late sowing, and infallibly a poor crop.

It is from hence to be concluded, that the true barley husbandry is, to get the land into the outmost degree of order intended, by October at farthest, in which month it should be thrown into the narrow ridge, and thoroughly well water-furrowed, that it may lye dry all winter, and be ready for sowing early in the spring: The plows, seedfman and harrows, should then follow each other close; that, if rain comes, it may find no land unprepared for it. A farmer should not allow his men to go with the plows at

a distance from each other ; (it is common for the men, each to take his acre), but make them go very near, that the field may not, in case of bad weather, be left in stripes, part sown and part unsown, with the water furrows open in one place, and choaked up in another : It is a common error, but a very pernicious one.

According to the husbandry here proposed, the farmer, if he will continue to take a crop of barley after one of any other grain, should give the tillage immediately after harvest, and ridge up the land as I have just described in October : but the common method is very contrary ; they leave the field in stubble all winter, for the poultry consideration of feeding sheep, delay the tillage till spring, and consequently sow late ; whatever their crop, we may pronounce it trifling, to what it would be with different management.

The greatest crops of barley gained in England, are in clay soils, well drained, that have a year's fallow, are ridged up in October, the manure carried on the first hard frost, and plowed, and sown as soon as dry enough, which is the end of February, or the first fortnight in March.

To argue against sowing barley after turnips would be absurd, but the turnip husbandry by no means allows of a good barley culture. There will be no difficulty in proving this satisfactorily to all my readers.

Turnips not a proper preparation for barley ! That is very strange ! cries an hundred people, who have seen the barley following turnips, fed off by sheep. I reply, that the manuring from the sheep, which by the way exceeds most others, here gives the great crop of barley, not the turnip preparation. It would be anticipating my subject to offer to prove this at present by experiment, but reason will do it alone. Those who argue so strenuously for this common management, should view the barley crops which succeed turnips when they are not fed off : Does the prospect shew, that it is the turnips or the sheep that occasion
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the great crop of barley? In order for the comparison, take a field half sown with turnips, and half fallow, or any crop that exactly equals the turnips: Let them be fed off the land with sheep, and the other half manured to the exact equality of that of sheep; is it supposed, that the latter barley will not equal the former! If on heavy lands it follows a fallow, it will most assuredly exceed it.

But further: Suppose the turnips on account of the flock are kept, as they commonly are, till the end of March, or throughout April, what will the result be then? Why the barley will be inferior by a third to the other that is not prevented from being sown earlier. It is a fact that cannot be disputed, that the very best turnip culture of barley in the most kindly soils in England, witness for instance the best marled lands in Norfolk, the crop fed off with sheep do not near equal the product of barley from summer-fallowed clays manured in a common way with farm-yard dung, and sown so much earlier than the turnips will allow. Four quarters are a great crop in the best parts of Norfolk, they have sometimes five; whereas in Essex drained clays, six quarters are a common crop, and eight often gained.

The great use of turnips are in January, February, March, and April: The farmers that have great flocks keep them as late as possible: In other words, they are not off the land, when the barley ought to be green as a meadow. How is it possible, such a culture can be comparatively advantageous to barley? When turnips are kept so late, I should apprehend it would be a particular advantage to let some other crop succeed them that will bear sowing much latter than barley. Quære, For instance, if such a crop of buck-wheat as would be gained on turnip land in fine order, would not much exceed in value the common barley crops that follow turnips? If it is considered, how little buck-wheat exhausts the soil, I have no doubt of the point.

Upon

Upon the whole, the preceeding experiments prove, that the grand object in the culture of barley is to sow early; and consequently, that a farmer, whatever be his soil or plan, should, if barley is his chief or an important aim with him, so prepare his land as to admit sowing on the first spring earth, whether the season allows it in February or in March; but later he should not venture to sow; at least on such soils as mine. The gaining good crops in April, or even May sowings, does not prove the contrary, as such events must be owing to extraordinary, natural, or artificial fertility; which would yield proportionably greater crops, were the season of sowing more advantageous.

A R T I C L E. LII.

Of Paring, Burning, and Liming Moor Grounds.

[From YOUNG's Farmers Letters, Vol. II.]

THROUGHOUT all the north of England, the proper method of breaking up waste soils is agreed, from a long course of uninterrupted experience, to be paring and burning; But as it has of late been the fashion in the south to explode this culture, something must be said to reconcile such jarring opinions.

The advocates for this method of improvement, produce a vast range of experiments to justify the practice; whereas its enemies found their opinion merely on reasoning. How is it possible, say they, that it can be profitable husbandry to reduce an inch of the best part of the soil every fifteen or twenty years to the thickness of a sheet of paper? The argument is plausible; but what would be of twenty times the importance of an hundred arguments would be to produce a field of a thin staple: *This land was once Good in the depth of ten inches of soil; it is now Bad from hav-*
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ing but four. But no such instances have, or can be brought. On the contrary, it is to be proved in all the countries where paring has been long in vogue, that very shallow soils have been many times pared within the memory of old men, who likewise retain the tradition of the same soil having long before their time received the same treatment; and yet remained at the former thickness.

But if the difference of the thickness of the turf pared, and the thinness of the ashes spread, were the rule to judge by; the argument, in proving too much, would prove nothing. Many tracts of the shallow land in question have been known to be regularly pared, and burnt once every twelve or fifteen years, for a century past. Now, supposing it had lost two thirds of an inch every time, in only eight times suffering this operation, the surface must have been reduced six inches in thickness: But how does such a state of the case agree with the soil being at this day six inches thick, and well known never to have exceeded it? Which is actually the case with several tracts of land I have viewed both in the northern and western parts of this kingdom. There is, in a word, great reason to think, that this practice does not at all diminish the staple of the land.

Whether this be owing to the great crops it is enabled to yield, returning a proportioned part of themselves to the earth again, which is the case with all sorts:—Or whether the surface pared consists not entirely of turf, or the bulbs of sainfoine, with no earth at all, or at least none reduced to ashes, I shall not pretend to decide: but the latter circumstance I think very probable: Turf, which is nothing but an aggregate of roots and bulbs, may certainly be burnt without any reduction of Soil. I am of opinion that Soil cannot be reduced to ashes; but in this, experiment should decide. A strong confirmation of this notion is the well known fact, that land cannot be burned till it has acquired a turf; that is, till it has gained

gained the thickness which was destroyed by the last burning.

The efficacy of the practice is indisputable; a middling quantity of ashes is 500 bushels per acre. Suppose a man, instead of paring and burning at 16 s. or 18 s. expence, would bring ashes to his ground; he would no where be able to get them, carriage and expences included, under 6 d. a bushel, which amounts to L. 12 - 10 per acre: It is evident enough, that such a plan would never do.

But the grand point of paring and burning is the bringing waste soils into culture, one may almost say, in a single day: it is pared and burnt, once plowed, and sown immediately with turnips; a crop which never fails after that management. Thus is the work done at once: But substitute the plow alone—what a tedious, complicated, expensive process ensues, to bring about a much inferior profit.

I have heard this husbandry ironically called Most Generous, *for you burn your own soil to distribute it to all your neighbours.* But those who talk thus, know not what the operation is: The ashes are not like those of wood, that blow about like dust; much of them consists in half burnt roots and vegetables—or at least of a gross ash, but little moved by the wind; but supposing it ever so light, who but the greatest slovens leaves them to be blown away? On the contrary, they are immediately spread, and plowed in hot. We are not to condemn manuring with wood-ashes, foot, or lime, and yet the wind affects all of them more than the ashes in question.

Another circumstance, very important, is the great efficacy of this husbandry in destroying ling and other spontaneous rubbish, at the same time that all grubbs, worms, and insects are killed; These are advantages unequalled by any other mode of breaking up land.

For these reasons, and a thousand others too numerous

to mention here, let me, on all accounts, advise the improver of these wastes to adhere to a practice proved from innumerable experiments to be excellent, and not fly to schemes that are recommended by reasoning alone. Let him cordially embrace a method singular in that admirable circumstance, of reducing the wildest, blackest desert, in the space of a single month, into profitable crops; a point sufficient to overcome all the arguments against the practice, were every one true. I have actually seen a fine promising crop of turnips on land, that only a month before, was as black as night itself †.

The price of paring, burning, and spreading the ashes in the moor countries, varies from 14 s. to 17 s. and 6 d. They perform it very well and effectually for that sum, so as to have the plough follow them without interruption, This price is cheap; but yet from dexterity and custom, they make such good earnings at it, that many men apply for the work, the moment it is known that any is to be done; and I found from various enquiries, that there would not be any difficulty in having the largest quantity of land pared and burnt through a want of hands; however, I shall, to obviate accidents and objections, calculate

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† One of our correspondents pointed out this essay, and writes us, that he was last year induced by it, to try the experiment on such ground as is here mentioned; which so far succeeded, that by the end of June his ground was fine as garden mould. The turnips indeed did not succeed: owing evidently to the whole soil being heated by the burning, and the dry weather at the time; they did not appear till near the end of July, when the rains became frequent: But he is confident had they got a shower soon after sowing, he should have had a plentiful crop.

at one pound per acre, a price that would at once draw all the parers in the country.

The benefit of this practice as a manure, is every day clearly seen by the vast crops which succeed it for some years. I have viewed many fields taken from the very blackest moors that were cropped, first with turnips, and then with 5, 6, or 7 crops running of maslin oats, or barley-big, and laid to grass with the last, reckoned by the farmers then in good heart,—and even with this management, the grass has been directly worth 15 s. an acre. All which is sufficient to prove, that the soil must be in prodigious heart after this operation. It is true they lime a great deal, and of that manuring I shall speak next.

Liming throughout the moor countries, has been long the universal practice. In most parts of the Northern counties, they make it an universal manure; probably it is in cultivated countries, more used than it ought to be.

Many very ingenious men have started objections to liming even moors; and they found their opinions, (for they do not pretend to offer *experiment*) on the qualities of lime wherever found. They want to have it explained with a philosophical precision, how a body, that of itself is no food for vegetables, should prove so rich a manure.—Now I am sensible of being very unequal to such speculative points; and as I never conducted a series of chymical experiments on lime, I consequently cannot speak from my own experience; but if we compare the qualities which chymists give to lime, with the nature of the moors, there will, I apprehend, be no difficulty in accounting for the strong effect, which undoubtedly accrues from laying the one on the other.

The moors have scarcely any marks of former culture—no tradition gives the least trace of culture. History to the remotest periods gives no reasons to suppose these parts of the country ever in a state of cultivation; the greatest tracts
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of them are in the mountainous parts of the northern counties, which, it is well known, were for ages over-run by frequent incursions and invasions of two neighbouring but hostile nations. In a word, there is much reason to suppose the moors at this day in the condition they were three thousand years ago—with no other alterations than the cutting and spoiling the spontaneous growth by armies, or the poor for firing, and perhaps, in some instances, for building. They maintain some sheep.

The soil, as I before remarked, is a black, loose, spongy substance: I conjecture all these black parts to be literally nothing but rotten vegetables kept loose and open by the roots of the spontaneous growth. Thus, in fact, the soil is a dung hill; an opinion not very contrary to reason, when the crops it yields are considered. However, land that has laid in such a state for a long succession of ages must inevitably be rich: In the north, men are apt to give a shrug at the very mention of cultivating them: For my part, I consider vast tracts of them as the richest soil in the island of *Great Britain*. “All rich soils in a state of nature contain oil,” says an ingenious writer.

Next as to lime; one tells us—“There is a great attraction betwixt quick-lime, and all oily bodies; it unites intimately with expressed oils.” Again, “Its operation is to exhaust the earth of its oils. Lime laid on ground wore out by continual crops, rather hurts it than improves it; because it does not meet oil or oleaginous bodies to act upon and blunt it. The proper cure for this, is to mix dung with the limes, so that it may have something to act on.” And again, “Lime is a great dissolver of all bodies, both vegetable and animal. In this way it certainly operates in the earth, by dissolving all animal and dry vegetable substances, and converting them to the nourishment of vegetables, at least sooner than they otherwise would be.” In another place, ‘By mixing
itself

“ itself with the oleaginous particles of the soil, and converting them to the nourishment of plants, lime becomes, in this sense, provocative to the soil.”

Now, is it not sufficiently evident from this description of lime, that the effect of it on a soil in the rich state of nature, that must abound with oil, must be very great? It is mischievous upon worn-out land; for the same reason it is excellent on new. But even then, it is adviseable, if dung is added, which is the addition of what the moory soil contains in the greatest plenty. Further, lime dissolves all vegetable substances, and prepares them for the nourishment of plants. This is an operation of the greatest consequence, on moors which seem to consist of scarcely any thing else. Lime is a provocative to the soil. This is all the moors want; they abound with natural fertility, but require the assistance of lime speedily to render it fit for the production of new vegetables.

That these moory soils are abundantly fraught with oleaginous matter, cannot be doubted from this circumstance. It is a common custom, and has been so for many years, with those farmers who cultivate their soil, to lime their land both arable and grass **EVERY** year, if they can get it cheap; and this whether they dung them or not. Now, all writers agree, that perpetual liming of common soils will reduce them almost to a *caput mortuum*, unless a regular accession of dung be also gained. But on moor soils, the benefit of these repeated limings are indisputable; and the farmers from long experience assert, that you can scarcely lay on too much. Now, let me ask those gentlemen who affect to call the moors *poor land*, what they think of this fact? Is it not the strongest proof imaginable, that the soil is an actual dung hill? That it is so fraught with fertility, you can hardly destroy it?

But there are some other general circumstances concerning lime upon moors, which merit greater attention. There are
three

three points, which an improving landlord should particularly attend to : First, the existence of lime-stone upon his estate : Secondly, if it is not on his own land, that it may be within a short cartage of it, on roads either good, or easily to be made : Thirdly, that if he enjoys neither of these circumstances, but is forced to draw his lime from a distance, that the roads be good enough for the use of a broad wheeled waggon. If an estate is so unhappily situated, as to possess none of these advantages, then the improvement of it must not depend on lime, but on paring and burning alone ; the efficacy of which on moory soils I am not acquainted with ; for wherever I made my enquires, lime was always at command ; nor do I apprehend, that one estate in a hundred is in such a predicament ; the supposition, therefore, is not material to the point of improvements in general.

There are some tracts of moors, that are supposed to be without lime stone ; and the farmers adjoining them, bring it 5 or 6 miles ; but I could never find that diligent search had been made after it : It is the opinion of the most unprejudiced gentlemen, that it might be found, if attentively sought after ; for these tracts are not extensive, and lime to be found at a few miles distance all around them. This search, should therefore be the first business of an improver in such a situation.

A R T I C L E. LIII.

Of making and preserving ground clean, by a judicious use of dung prepared in compost dung-hills ; and thereby procuring good and clean crops of wheat.

[MUSEUM RUSTICUM Vol. V.]

AS you seem to encourage all well meaning men, who wish to improve our national husbandry, permit me for once, to solicit a place in your work for a letter, tho

tho' it may not, perhaps, be so valuable as some others, written by your more enlightened correspondents.

I am, it is true, but a young man ; yet have I made some remarks in farming, which, in my humble opinion, may prove not unuseful to many of your readers.

It is now upwards of seven years, that I have been tenant of a considerable farm in Essex ; but as there are some particular circumstances attending this farm, I must beg leave to say a few words on the subject.

The soil, which is, for the most part, a fine mellow loam, or what is in general called a good wheat soil, was in very good heart, and not impoverished ; yet the last tenant broke on this farm, and the landlord lost by him near two years rent ; for his crops of wheat were continually damaged by smut, let him take what care he would of the seed, and were besides often laid and the land got very foul, tho' he was not sparing of his fallows.

On the contrary, since I have occupied this land, it has born large crops of good sound wheat, with very little smutty corn, and barley, oats, pease, beans, and other things in proportion. What will appear still more surprising, is, that I do not lay on half so much dung as he did.

It will now, perhaps, be necessary to explain this seeming paradox. At no great distance from the farm lives the landlord, who is a man of fortune, and drives a set of horses. This gentleman keeps no land in his own hands, so that he was for many years obliged to buy all the straw used for the litter of his stables, which amounted to a very considerable quantity : However, when the last tenant of this farm came into it, having been a servant in the family, he offered to supply the 'squire with straw for his stables, provided he might have all the dung, except what the gardener had occasion for. The 'squire thought
this

this a good proposal, and the farmer imagined he had the best of the bargain; so the matter was soon settled.

Now, you are to understand, that the 'squire kept, besides seven coach horses, a stable of hunters, a number of road horses, and a pack of hounds; so that there was made on his premises, in a year, an incredible quantity of rich dung.

The farmer imagined, he was now in a fair way of making his fortune; for his father had taught him, that the man who can command dung is always sure of large crops: But this did not prove true, in the present case.

To proceed; my predecessor went on plowing his land, got his fallows in good order, dressed them largely with dung, and always sowed them with wheat.

His crops of this noble grain, however, by no means answered his expectations; his wheat constantly looked well and promising in the winter and early part of the spring of the year; but as it advanced it grew rank, and at harvest was either run all to straw, and was besides very smutty, or else if a heavy shower of rain happened to fall, it was lodged, matted, and grew. This was indeed a very mortifying circumstance, but our farmer could find no remedy for it. He several times, without success, tried folding some sheep on his wheat; but this part of husbandry, for want of skill, he managed so badly, that he lost two entire crops, for he had scarcely the return of his seed at harvest. This could never hold long; so that in the end he was, as I said before, broke, and ruined.

This man never could be persuaded that any part of his loss was to be attributed to the dung he laid on his land, though he constantly manured it with the horse dung before it was half rotten, and without any mixture to allay its great heat. This kept the soil in a constant state of fermentation, and stocked it with weeds, in so much, that,
when

when I took possession of the farm, some of the soil was absolutely mouldy, and stunk again, it was so rank.

I will now inform you of my methods of management, that you may be enabled to judge how far I was benefited by the errors of my predecessors.

I have found sixty acres of fallow ready for sowing with wheat : These, as the land was rank, I sowed with the winter-tare, which I knew, by experience, would choak the weeds and abate the rankness of the soil. In some parts, where the soil was not so rank, I plowed in the tares in order to sow wheat over them ; in other parts I suffered the tares to stand for a crop, which, however, was not considerable, they ran so much to straw or haulm.

When the tares were off, I got the land instantly in order, and sowed the whole with wheat, of which I had a better and cleaner crop than had been known upon the land for upwards of seven years before : This all my neighbours acknowledged : However, it was neither clean enough nor considerable enough to satisfy me. Some of your readers may, perhaps, wonder what I did with my tares, as but few were sold at the country-markets ; but I must inform them, that I live within ten miles of a sea-port town, whither I sent them at various times, in order to their being carried by sea to London.

I am to observe to you, that I continued the agreement of giving the 'squire straw for his dung ; but I made an use of it very different from my predecessor.

I make it a rule, never to manure for wheat, or sow wheat on a fallow. I do not indeed allow many fallows on my land ; and when I do, I generally sow my fallow with barley, to which I allow four or five plowings. This commonly yields me a large return, and I have a good crop of wheat after it.

This, however, is not my general method ; for I am very fond of the hoeing husbandry, to practise which, in some degree,

degree is the only infallible way of keeping land clean. To begin then with my method : I never lay dung alone on my land, let it be ever so rotten ; but as soon as I get any long dung from the 'Squire's, I carry it to my compost-heap, where it is mixed in alternate layers or beds, with fresh virgin earth, (if I can get it) lime, or chalk, lime rubbish, scourings of ditches and ponds, turf, leaves of trees, and all the dung and offal of my family, of the hog-yard, the poultry-yard, and the dog-kennel. As to my pigeons dung, I always preserve it to mix with foot, and use the mixture as a top-dressing for my wheat, whenever it happens to be too backward in the spring.

But to return to my compost : I have always several distinct heaps of different ages, and I sometimes leave it three years before I use it, and never lay on any under two years old.

When I have got a plot of ground in order, I give it a thorough good dressing of this compost, which I immediately plow in. I then sow it with some crop that requires hoeing, such as horse-beans, broad-beans, or white or gray pease. During the whole summer, I take care to keep these crops very clean by hoeing, especially if the season is rainy ; and I am particularly cautious in preventing any of the weeds from perfecting their seeds.

When my hoeing-crop, which generally more than pays me all my expences, is off the land, I immediately get it into as fine tilth as I possibly can by repeated plowings, and then sow it with either wheat or barley, which-ever is likely to pay me best ; for little as some of your readers may think of it, barley, when it is sown on good land well prepared, is very frequently as profitable a crop as wheat.

By thus sowing my wheat after a hoeing-crop with dung, I have always a good return of clean corn, often five quarters on an acre ; and my land will still be in heart

enough to give me a reasonable crop of oats ; after which without any fallow, comes my hoeing-crop, &c.

When I sow barley after the hoeing crop I suffer wheat to follow it ; and then it is that, if I find it necessary, I give the wheat in the spring a top-dressing of foot mixed with pigeons dung.

I sometimes allow only six pecks of wheat seed to an acre : This is when I sow over it, in the spring of the year, 18 lbs of broad clover-feed, which I harrow in with a pair of very light harrows ; and it does not in the least damage my wheat plants. I leave the clover only two years on the land ; for the second year, after I have mown the first crop for hay, I suffer the second to grow very rank, (having given my land a slight dressing from my compost dung-hill the preceeding year) which I plow in, and over it sow wheat, to be harrowed in on once plowing.

These crops of wheat are smaller in quantity than any others I get, but the grain is finer, plumper, brighter, and heavier, generally selling for more at market, as being always very clean, and clear from seeds of weeds.

In my method of farming, some particulars are to be noted. In the first place, as my crops succeed one the other very quick, I am under a necessity of having all my stubble extirpated, before I give the land the first plowing after the crop is cut off. If it is a wheat or bean stubble, I generally have it all pulled up by hand by women and children ; barley and oat stubbles, I have torn up by a pair of loaded drags, and afterwards gathered into heaps and carted to the compost-heap. This I do to prevent the stubble from being buried by the plough, and from growing mouldy in the land ; from which mouldiness I have great reason to think smut often proceeds.

Another thing to be noted is, that I allow less seed to my land than most of my neighbours, my quantity being from seven to nine pecks of wheat, from nine to twelve

of

of barley, and about twelve of oats, to an acre of land; but it is always to be presumed, that the seed I sow is good. If any farmer should imagine that these quantities are too small, let him suppose every wheat plant to occupy a space of six inches square, which is small enough: Let him then calculate how many such spaces there are in a square acre. When he has done this, let him proceed to count how many grains of wheat there are in a pint, which multiply by the number of pints in nine pecks, and he will find by the result that I, in fact, allow too much seed.

I intend this letter, only as a sketch of my method of farming; and, in truth, it was chiefly written with a view of satisfying some of my neighbours who are readers of your work. These farmers saw, that my crops were better than those of my predecessor, yet wondered why they should be so, for they know not the method of managing their dung to the best advantage; nor are they at all acquainted with the value of hoeing crops, tho' they see so many farmers in the country fond of sowing them. Another thing puzzled them, which was, how a man could possibly carry on the business of a farm, without fallowing all his land once in three years.

A R T I C L E L I V .

Of the growth and destruction of Ragweed or Ragwort.

[MUSEUM RUSTICUM Vol. LIV.]

THis is a most pernicious weed, and is apt very soon to over-run grass and pasture grounds, where it is neglected, and allowed to grow. Its seeds are winged, and are thereby blown about by the winds; and it is remarkable, that, in cow pastures especially, where the seeds in
flying

flying are apt to be caught by the soft dung of the cow, it very soon predominates.

The botanical name is *Tacobæa*, and in England it is called *Seagrim*. It has a stalk in its early state, green, but as it advances in age, inclining to *violet* or *purple*, especially downwards. Its flowers are yellow, and thick-set, and composed each of a number of small-pointed leaves. It runs to seed in the latter end of summer. The smell both of the stalk and leaves, which are jagged, (whence probably it obtains one name) and the flower itself, are offensive to all animals, I think; for I have observed that hardly any creatures feed upon it, except almost hungered or starved. I have not indeed observed whether or no asses reject it.

About four years ago, I observed the spreading of this weed in that part of this estate, which was in our own hands. I took notice that neither cows nor horses eat it; and when I smelled it, I ceased to wonder that they did not. It was obvious to remark, that a weed so bulky as this, and so gross, must extract much nourishment from the earth, and that it was adviseable, to get rid of it as fast as possible. The most easy method was mowing. I therefore ordered a servant to mow these weeds in the pastures, as near to the ground as he could; and I hoped that the common mowing in the meadows would be sufficient to destroy them: But I soon found my mistake; for in a very few weeks, these offensive strangers shot up again into stalk and leaf, and even flower, tho' all in much smaller size than before, but with this disagreeable circumstance, that the root was so far from being injured with the scythe, that for one stalk several arose, and the root seemed now to have gained vigour from the wound.

I now applied myself to plucking up by the roots these odious in-mates, and found new difficulties; for while the ground was dry, as it usually is in the latter end of summer,

I found the stalks of such of the ragweeds as were longest, and afforded the tightest grasp, either break in plucking, and leave the root in the ground entirely, or at best bring with it only a small part of the root; and when the wet weather came on, and loosened the ground, and made it *possible*, or even *easy*, to bring away the whole ball of the root, yet the season of seeding was come on also, and the earliest ripe seeds had dispersed themselves, and produced an assurance of a larger crop for succeeding years than the most careful plucking of the present crop could destroy.

But if these were the difficulties which attended my attempts to eradicate these *ragweeds*, which had happened not to be mowed, I was much more embarrassed by those which had been; for here it was impossible to get any such fast hold, as to pluck them up with *much*, or even *any* root.

I now applied myself to enquire what *gentlemen* or *farmers* were plagued with this weed, and what methods they had tried with success to destroy it.

I was told by a gentleman in my neighbourhood, that he had been plagued with this weed, and had pursued the method of plucking with success. Animated with this assurance, I resolved to pursue this method with great attention; and as it seemed to be a work which required great care, both in the choice of *season* and *manner* of plucking, I resolved not to depute the work to others, but to endeavour to clear a spot in my cow pasture with my own hands, that, if my labour succeeded, I might employ others to follow the same method under my own eye, in the rest of this pasture.

Accordingly, in the evenings of the *summer*, or rather *autumn*, of 1762, after showers, I applied myself to this work; and by help of a pair of strong gloves, and a tight grasp, I brought up almost every root, in a space of about

bout 200 yards square, whole ; so that I had good hopes I should see this spot clear in the succeeding summer. It is true I saw leaves of the species of this weed, and of a very vivid green too, around the plants which I pulled up ; but as I *reasonably concluded* these to be fed by the taws which spread themselves from the main root, so I (methought *reasonably*) *concluded* also, that this main root being destroyed, the side taws would die, and consequently those young leaves.

But how was I disappointed, when in the summer of 1763, I saw this spot of ground as much over-run with *ragweeds*, as any part else of the pasture which had been unpulled !

Conversing, however, on this subject with a neighbour, towards the latter end of summer, I was assured by him, that, by a repetition of this labour of plucking for some years, he thought he had lessened the number of his *ragweeds*, though they were still numerous. Urged by this example, I have gone through the whole of my pastures, which is about ten acres, and keeps five cows, at the latter end of last summer of 1763, with the same care as was used to a small part of it in 1762 ; yet am I not elated with much hope of success ; for a little plot before my garden (in which my horses run, and which was managed with still more accuracy on account of the odious appearance of the *ragweeds* from my windows) seems to threaten another considerable crop.

As I did not confine my enquiries about the method of destroying this hateful weed to any one rank of men, I was told by an honest quaker, a farmer in my neighbourhood, that he had found turning of sheep in winter into his cow pasture, the only effectual method of destroying this hateful weed.

I thought this method very likely to succeed ; for sheep are such close eaters, that I have known them destroy whole
beds

beds of the rankest docks, which could not be killed by any other means.

I have not been able to try this experiment considerably; for, as I am raising quick fences, both in my meadow and pasture, I keep no sheep. I have, however, occasionally admitted some of my tenants sheep into the small plot before my garden this winter; and, upon an accurate examination this morning, I do not entertain any sanguine hopes of great success from this method. I find that many of the young leaves of this weed, now level with the surface of the ground, are untouched by the sheep; and that such others as appear bitten by them do not seem in a dying condition.

The truth seems to me, that sheep, though they may not have the same aversion to this weed as horses and cows, yet are far from being fond of it; and if any great success is to be hoped for from their bite, (which may prepare beds for the water, and so decay the root) the sheep should be folded pretty close upon it, and obliged to eat it near, and at such a season that the winter-rains may have time to work its destruction. And such a method, if carefully pursued, seems to be most probable for the extirpation of this pernicious weed.

If the method of plucking is followed, I would subjoin some cautions.

First, In order to prevent the large plants from seeding, I would advise to cut off all the tops, and the tops only, when the flowers begin to die, that then good hold of the stalk may be gotten.

Secondly, I would defer the plucking till the rains have moistened the ground sufficiently to bring up the whole main root.

Thirdly, I recommend striking the root so brought up against the ground, in order to disperse the earth which adheres to it by way of manure.

Fourthly,

Fourthly, I always pile the plants thus pulled up and cleansed from earth, that, if the season prove favourable, they may be burnt, and the ashes arising from them spread on the ground ; or if this cannot be conveniently done, (though it is much the better method, and may, with a sufficient fire, be done when they are ever so green) left to rot and manure the soil.

The grossness, and even stench, of this weed, is a proof of the great quantity of salts it contains ; and in the same proportion as any plant exhausts the ground of its salts, it repays when reduced to manure. There can, however, be no question, but, whilst weeds are left to rot, a great quantity of the salts, which by burning would mingle with the soil, are carried into the air.

I have only to add, on this subject, that I am persuaded *ragweed* does more harm in *meadow* than *pasture* land ; for in the latter it only exhausts the ground, on which it stands, to no good purpose ; but in the former it communicates its disagreeable stench in the sweat to the good hay, and destroys its sweetness. I advise, therefore, that hay makers be ordered to throw it with their rake-shafts out of the swath when ever they meet with it.

THE
SCOTS FARMER,

JULY 1774.

ARTICLE. LV.
FARMERS KALENDAR.

AUGUST.

Wheat Harvest

NOW is the time that the farmer gives the first of his attention to that golden crop, WHEAT. Having been a year at least, perhaps a year and a half, or two years, in gaining it, he is now anxious to get it safe within his barn. Bad weather now greatly injures his profit; he must have many hands at work, to make the best use of fine seasons, or he will gain the name of an *afternoon farmer*.

Reaping is a work often put out by the acre to the men, and it may be done as well so as most works; but it is necessary to observe, that they do not cut or bind in improper weather, and that they make the sheaves no larger than proportioned to the quantity of weeds in them, and the ripeness of the corn. In the forming them into shocks or stacks, there is in some counties an art of making them in such a manner, that they shoot off the water, and are kept tolerably dry in wet weather, without being laid so close, as not to dry with the sun and wind: It is a good practice, and deserves imitation. Some farmers leave their corn standing so long, that it is ripe enough to *cut and*

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H h h

carry,

carry, as they call it ; that is, they cart home the sheaves as soon as they are bound : But this will only do for very clean crops ; for the weeds in a sheaf are never withered enough at cutting, to carry directly.

In a farm-yard, where there are teams enough, carting the wheat crops goes off very quick with three waggons : One loading in the field, one unloading, and one upon the road, going backwards and forwards : Five horses are sufficient for them, and two men to load, one to drive, and two to unload ; in all five : Which will make great dispatch.

In some counties, it is common to stack all the wheat, if they stack any thing ; and they are certainly right in the practice. No rats or mice can get into a stack if it is built on a floor raised on posts, in the common manner ; and wheat, being in sheaves, admits the cut ends of the straw all to be laid outwards, so that the grain is defended from every injury, from all external attacks : whereas any corn that is not bound up is much damaged. Wheat is also found to carry a much finer countenance out of a stack, than a barn : The admission of the air gives it a brighter colour. In getting a stack into the barn for thrashing, difficulties sometimes however arise ; a whole one should be got in at once, it being very dangerous to leave a broken stack exposed all night. It must also be done in fine dry weather, which in winter the farmer may wait for in vain some weeks, and thereby find great inconvenience. Some of these evils would be remedied, and at all times a great expence saved, if a window was cut in the side or end of the barn, and the stack built against it, near enough to lay some short planks from one to the other, and so do the whole by hand, throwing from the stack at once into the barn. These are points that should be well considered at harvest, when the stacks are built.

Barley,

Barley, &c. Harvest.

The barley crops should generally have good field room lying three, four, five, or six days after mowing: They will improve, and, if a heavy shower of rain comes, it will not diminish the farmer's profit: It will make the grain swell, and measure much more per acre; for maltsters reckon much on their profit in such dry harvests, that the barleys receive no rain after they are mown. But ever observe, that barley, oats, &c. be quite dry when you cart them; Corn is always greatly damaged from being carried in damp or moist; A heat is contracted in the mow, and the grain much discoloured, and the straw spoiled. Both are great losses, and the latter not the least; for barley straw, well housed, is excellent fodder, but greatly lowered in value by bad harvesting. After the fields are cleared, they are raked with an instrument generally called a *dew-rake*, from its being used in the dew of the morning: A man draws it by a broad leather strap. This is a very bad contrivance. The work goes off very slowly, and, being hard, the men often neglect doing it well, and much corn is left in the field. Instead of it, there is in some countries a machine called a *Horse-rake*: A rake ten or twelve feet long drawn by one horse. This machine expedites the work greatly, at the same time that it does it much better. The use of this should be universal; for one will work against twenty men, as I have experienced, and the price is not above four guineas and an half complete.

Buck-Wheat.

This is a difficult crop to harvest, for the least improper treatment makes it shed the seed in the field, to the great loss in product: If ripe, it should be mown only in the dew, and left to dry in the field; and if it stood but a few days too long, it must also be carted in the dew,
or

or it will shed in carting. The grain being black, the colour of the sample is not a matter of consequence.

Pease.

All strong crops of hog-pease must be hooked and not mown, and great care should be taken of turning the heaps after rain; for the stalks and leaves are so succulent that the straw will presently spoil if it is neglected, and, if well got in, it is good fodder for most sorts of cattle. If they are stacked, great care must be taken to thatch the rick immediately, and to do it perfectly well; for a little wet getting in, will be of great damage to the pease.

It has been recommended in some books of husbandry, to stack the hog-pease in a convenient place for fattening hogs, ready to cut down in slices for the swine as fast as they eat them, to save the expence of thrashing, but it is execrable husbandry: The saving is contemptible, but the loss great. Lean hogs in a yard will eat up pease clean, and in much straw, leave scarce any; but the case is very different with fat ones; they will eat only the pease that are next their noses, and tread half into the dung.

Beans.

Beans are always reaped and bound in sheaves, like wheat, and being generally late in harvest, and extremely succulent, they require being left a good while in the field; and for the same reason they should be tied in small sheaves. In binding, there are variations: The bands are made in some places of wheat straw; in others of yarn twine, which will last two years if the thrashers are careful to save them: Beans do very well in a stack.

Harvest-

Harvest-Men.

The agreements with harvest-men in various parts of the kingdom, are extremely different, and even in the same place there are many variations, some farmers pursuing one method and some another. A common way, in some parts, is to agree with the men, for all, by the acre; to reap or mow, turn, shock, make, cart, stack or barn, drive, &c. to do all the business of the harvest, in short, at so much *per* acre: This is a very good way; but it requires a man to be almost as watchful as day work: For a very strict eye should be had to the manner in which every thing is done; that the men do not cut your corn at improper times, that they take proper care to turn it after rain, and to get it perfectly dry into the barn. A pretty sharp attention will be requisite to all these points, and many others. On the other hand, when the work is done by the day, month, or week, it requires constant attention, early and late; to see that the men work their hours, and that upon *carrying*, in dubious weather, they work as long as they can see, unless the dews are heavy; for it is a maxim in most countries, that men are not to talk of *hours* in harvest, but to do whatever they are ordered.

In many counties, it is the custom to board the harvest-men, and in some they are fed at an extravagant rate: I would by all means advise the economical farmer to vary this matter, if possible, unless the men really work at a great rate, and stick to it early and late; but, if the custom is rooted so deeply, that they will not give it up, then it is an object of attention to make the expence as moderate as possible, which must be by a previous plan of fattening a beast or two, and a few sheep for the purpose; and also by providing whatever else may be consumed.

Farm-

Farm-Yard.

At the leisure time of Harvest, such as the wet days when the team cannot carry corn, and while all the harvest-men are employed in reaping and mowing, if the works of tillage do not require attendance, let the horses and oxen be kept to earth-cart, to form the bottom layer in the farm-yard, carrying marle, chalk, turf, ditch-earth, or pond-mud : The quantity in proportion to that of the dung, which you expect will be raised in the ensuing winter. This work, it is probable, will not be completed this month.

Turnips.

The second hand-hoeing of the broad-cast turnip crops must be given some time this month, nor should it ever be omitted on account of works of harvest. In counties where turnip-hoeing is a common business, there is no difficulty in this, as men enough are always to be had. In some places, many of them make it their business to hoe all harvest through, earning more at it, than by other field work. But in countries where hoers are scarce, a farmer should always consider his turnip crops when he agrees with his harvest-men, and hire a sufficiency to set them to hoeing as regularly, when the turnips want it, as to reaping, when the wheat is ready.

Look well to your drilled crops : Both the horse, and hand-hoings, must be given when ever weeds arise, or the land seems to be growing adhelve.

Cabbages.

The beginning of this month, the second horse-hoeing should be given to the *midsummer-planted* crop of cabbages : The earth thrown into a ridge, in the middle of each

each interval, by the first, should now be split by the double mould-board plough, and thrown half to one row, and half to the other : This earth, which has been for some time exposed to the weather, will be in fine order for the young fibres of roots to spread in ; nor should it be stirred by the succeeding operations : For the cabbage is a plant of such a luxuriant growth, that the roots have power to follow the well-pulverized land thus thrown up, and the cabbages will certainly be of a size proportioned to the quantity of food the roots command. Care should also be taken to keep the tops of the ridges perfectly clean from weeds by the hand-hoe : None should be suffered to grow ; for on this part of the management much depends.

Sow Cabbage Seed.

This is the season of sowing for those crops that are transplanted in April or the beginning of May. Plow a piece of well flowed land untill it is as fine as a garden ; then manure it amply with very rotten dung, and turning it in, harrow in the seed : A pound of seed to every four acres of the intended crop.

Potatoes.

The potatoe-crops in rows must be hand-weeded if necessary ; but it is now too late to hand-hoe any crops. If the intervals are weedy, or bound at all, or the plants not sufficiently earthed up, run the cultivator through them, which will cut up weeds, and loosen the earth : After which the common swing-plough, or the double mould-board one, will strick them clean, and throw the earth against the rows, banking them up : This is very necessary ; for the running roots and fibres will follow such new thrown up earth, and increase the crop.

Lucern

Lucern.

The drilled or transplanted lucern will be ready again for cutting : Attend well to the state of the land, and take care to keep it in loose well-pulverized order, and perfectly clean from weeds.

Sainfoine.

It will now be time to turn into the sainfoine fields that were mown in June ; but you should be cautious of not feeding it with all sorts of cattle undistinguishably. Sheep, if kept too long on it, bite out the heart of it by eating quite into the bulb. Cows, oxen, horses, and young cattle, may feed on it with perfect safety.

Fallows.

A common fault with too many farmers is, the neglecting their wheat and barley fallows throughout the harvest, through a mistaken œconomy in not having hands enough to keep the teams at plough while the corn is cutting : They should never be idle. It is true all works should give way to carting corn that is ready for the barn ; but there is no such necessity, while it is cutting, turning, &c. works that require men alone. We often see the summer fallows over-run with thistles, and other weeds, by the end of harvest, at the same time that the teams have stood still three fourths of it. In defence of these manifest violations of good husbandry, they are too apt to adopt ideas consonant only with mistakes of the same kind. For instance : If you enquire the reason of a fallow being weedy, and the surface bound for want of plowing, they will tell you, that land should not be sown for wheat, that the crop will not do without many clods, that if it is sown, they should have nothing but weeds : All which shews plainly, that their fallows, so called, are no fallows at all ;
for

for fallowing land, without killing the weeds, is merely losing money without any expectation of return.

Dig-manures.

This is a work which should never stop for hay, harvest, or any thing else, if the farmer has money in his pocket and his plan is thus to improve his farm: The sooner the work is done, the longer he has the benefit. Suppose he has a vein or stratum of marle, chalk or clay, under his farm, of light unimproved land, and that he has hired it with a view to such improvement, it is very clear, that the sooner he gets the whole done, the greater will be his profit; for the longer he will enjoy the benefit of it. In such a business, teams should be appropriated to the carting these manures alone, and never taken from the work in harvest, seed, or other times; by which means, a vast deal of work is done in a year. Suppose the team to be four horses, and two large carts: Upon an average of distances around the pit, these will carry 25 or 30 loads a day. Suppose the former, and that you lay 100 loads an acre, every four days you finish one acre, and in a year seventy five acres. Hence you find, that you must proportion the teams, so as to allow seventy five acres for each, to finish the whole farm in the time intended. That ought to be a year; if the work is longer doing, it is a strong sign the farmer begins it without money enough in his pocket. Suppose he marles a thousand acres, he should set thirteen teams at work: But they should not be distinct, two carts to each, but three; one filling, one unloading, and a third moving.

Folding.

Let the sheep-fold never stop in this month: The flock will bear it well, and the benefit to the land too great to be omitted. Remember the general rule of folding the land

that will be first sown or turned in. You may continue to fold the lucern lands as fast as they are cut; and in want of them, those for wheat.

Hogs.

This is a common month for the sows to bring their second litters of pigs; and, if the farmer has not had the forecast to provide plenty of wash in his hog cisterns, he will find the disadvantage. Clover will not do for sows and pigs; they must be fed on the skim-milk, butter-milk, and cheese-whey, that have been collecting together through the preceeding months, while the dairy was at its height. Bran, pollard, barley, buck-wheat, or pease, ground into meal, and small quantities mixed in it,

Carrots.

About the latter end of this month, the carrot crop should be examined. It will require a slight hoeing, not an expensive one; but just to cut up the few weeds that may be supposed to have arisen since the last hoeing in June. If the former hoeings have been well performed, only a hand-weeding will do.

A R T I C L E LVI.

Of the culture of the Potatoe.

[From DICKSON'S AGRICULTURE, Vol. II.]

THE potatoe is one of the most useful of all roots. In every town, and indeed in every village, there is a certain market for it. In the neighbourhood of these, it should be cultivated not only by the farmer, but also by manufacturers,

manufacturers, particularly those, whose business obliges them to a sedentary life. The root affords a very proper food for a family, and the culture of it, that is the planting, hoeing and taking up, afford a very proper and beneficial exercise. Almost all of these, it is important to observe, may be performed by the sedentary manufacturer in his idle hours, and his health be much improved; such a practice as this ought to be encouraged, on account of its usefulness, by letting small pieces of land to such manufacturers for this purpose.

The potatoe is raised in a manner very different from the other roots which we commonly cultivate. In the root there are a number of what are called *eyes*, each of which is a separate plant.

Some of the English writers on agriculture, recommend the small potatoes for seed. This is improper; for the small potatoes have as many eyes as the large ones, and every eye, as I have observed, is a separate plant, and sends forth a stalk and roots: When small potatoes then are used for seed, a great many stalks come up in clusters, and the plants stand so thick, as to destroy one another. The largest potatoes are the best seed. When cut according to the eyes and properly planted, the plants are not in danger of crowding each other, and each plant has a part of the old root to nourish it, till it extend its roots into the earth. From all sides the plant sends out roots, which extend to a considerable distance, and upon these roots the potatoes are formed.

There are several kinds both of white and red potatoes. Some of them, when the earth is hoed up round their stalks, send forth roots from those parts of the stalks, that the earth is laid round; upon these roots, potatoes are also formed and nourished, so that there may be two or three rows of potatoes from the same stem and root of different depths.

The

The soil most proper for potatoes, is a light dry soil. If such a soil has but a small mixture of loam, or is tolerably rich and properly cultivated, it seldom fails to produce a good crop, and potatoes too of a good flavour. A stiff and wet soil is improper for them; and a good crop, is not to be expected upon it, unless the land is laid up in such a way, as to make it dry, and a considerable quantity of dung is laid on to render it open.

Not many years ago, potatoes were very rare in Scotland. A few only were cultivated by gentlemen for their tables; and these were commonly planted on what are called *lazy beds*. These beds were generally of such a length, as the break in the garden upon which they were planted would allow, and of such a breadth as a man, without any difficulty, could throw earth with a spade from one side to the other. Upon the beds, after being delved, was commonly spread a little rich dung, on the top of the dung were laid the potatoe plants, and earth from the trenches cut betwixt the beds, was thrown upon them, so as to cover them two or three inches deep. The trenches were made wide or deep, according to the wetness or dryness of the land.

In this manner, is wet marshy land planted at this day; and if the trenches make the land quite dry, a tolerable crop may be expected; but this practice is now followed rather to improve the land, than from the expectation of procuring a good crop of potatoes. The laying the land up in these beds, if there is a proper descent, frees it from the water, and gives the soil a degree of firmness, so that a plough can go upon it next season; if any considerable springs discover themselves in the trenches, the water may be carried off by covered drains, and the land thereby kept dry for the future. Sometimes there is no need, for either dunging or delving the beds; the potatoe plants are laid upon the turf, and covered with earth from the
trenches.

trenches. This is done at small expence, as the potatoes seldom fail on such land to produce large stalks ; by these the surface is covered, the grass is prevented from growing, and the soil tolerably reduced.

When the crop of potatoes is chiefly in view, they are not planted in this manner; they are planted in a manner less expensive, and more beneficial. It is of importance to give the land intended for potatoes, a plowing before winter, unless it is in its nature very open and free: If the land requires dung, the proper season for laying it on is before this plowing. It is not necessary that the dung be well rotted ; though it be rough it will answer equally well. When the potatoes are to be planted, which may be done any time in the month of March, or beginning of April, the land must be plowed again in narrow furrows, and the potatoe plants dropped into every second furrow. If the land is open and very loose, it may be plowed in wide furrows, and the potatoe plants dropped into every furrow. The plough as it opens the furrow for the second row of potatoes, buries the first row at a proper depth. The furrow should not be made very deep, and for this reason, two horses are sufficient for the plough. It is better in this case, to make them go-a breast, than in a line in the ordinary way. By going a-breast, one of them only goes in the furrow, and thereby, less hurt is done to the potatoe plants, and fewer of them put out of their places. If the horses could be made to go both upon the the firm land, the yoking them in a line would in this case be better.

The planting the potatoe in this manner after the plough, is much better, than the manner of doing it by a planting flick, called by us in Scotland, a *Dibble*. This method of planting by the dibble, is by far more tedious, and it has this very particular disadvantage, that the land is pressed down, and firmed by the planter treading upon it.

Whereas

Whereas, in the way of planting by the plough, the earth round the plant is quite loose, and the land left in the openest situation possible; this is of advantage to the growing of the plants, and there is no danger from drought, as the season of planting is early, and the plants laid deep.

When small quantities of potatoes are cultivated by manufacturers, they may plant them with the spade, in the same manner that the farmer plants them with the plough. They may open with a spade, a furrow or small trench, at the end of the ridge across; into this furrow they may drop the potatoe plants at their proper distances, and in making the next furrow for this purpose at the proper distance they cover the plants set in the first made furrow, as is done by the plough.

According to the distance of the rows made by the plough, the distance of the plants in the rows should be regulated; one plant in a foot square is enough, to allow the plants to be properly hoed. When the plants are set in every second furrow plowed narrow, the rows will be about 12 or 14 inches asunder. The plants may be placed at the same distance in the rows: Or they may be placed nearer in the rows, and the rows at a greater distance, which is done by making the plough take off more by making the furrows. When the plants are thin set, and placed at equal distances, the earth on all sides is hoed up to the plants; but when they are set thick in the rows, and the rows at a distance, then the earth is hoed up only to the rows, and the weeds betwixt the plants taken out. The English writers on husbandry, that direct the using small uncut potatoes for seed, direct also, that trenches be made at the distance of one foot from each other, and the potatoes laid in these trenches at six inches distance. No person accustomed to raise crops of potatoes, would have given such directions. If we suppose, that three or four stalks come up from every potatoe, that these clusters are only
fix

six inches distant from the clusters in the same row, and twelve inches distant from the clusters in the contiguous rows, it must appear, that the surface will be so much covered, as to prevent the air from having access to the roots, which it is certain from experience, is a very great loss to the crop.

It is not necessary to harrow the land, after the potatoes are planted : It may be allowed to remain in the situation in which it is left by the plough, till a crop of weeds appear, and then it may be harrowed to destroy these weeds.

Though the potatoes are planted early in the spring, or even before winter, yet they do not come up till the month of May : Before that time the weeds are far advanced ; and if they are not destroyed by the harrows, the land must be hoed. The destroying the weeds at that season, is of great advantage to the crop, and the operation may be performed without any danger to the young plants ; for though some of them may be so far advanced, as to be cut by the hoe, yet this does but little harm, as they spring again from the stalk, below where cut. The goodness of the crop depends much upon the preventing the weeds from coming to any height ; and for this purpose, the potatoes must be frequently and carefully hoed. If this operation is neglected, there is no reason to expect a good crop, for there is no crop more damaged by weeds than potatoes, and therefore there is not one that requires more frequent hoeings. If the rows are set wide, a kind of breast-hoe may be used to throw a little earth on each side, by which it is raised a little about the plants. This would make the work more expeditiously done than by the common hoe. The kind of hoe called the Dutch hoe, is used in this manner ; but it does not throw the earth to a side, but has an opening in the middle, for letting the earth raised with the weeds pass through.

Though large potatoes should be used for seed, and
though

though great care should be taken in cutting them, yet sometimes there will be two or three plants in one peice : When this happens, or when the stalks are in danger of covering the surface too much, as is commonly the case in light wet land, then the plants should be cleaned with the hand at the root, and only one stalk left to each plant. This not only gives air to the roots, but also prevents much of the nourishment from going into the stalks,

Potatoes succeed very well in the horse-hoeing husbandry : The plowing of the alleys allow the bearing roots to push themselves more easily to a distance from the plants, by which the crop is greatly increased.

When it is proposed to have a field of potatoes to be horse-hoed, it may be plowed in beds, or ridges of the breadth intended to be hoed, either in the winter or in the spring. The greater difficulty that there is in managing the soil, the ridges should be made the wider, that so the alleys may be the better plowed.

When the potatoes are to be planted, a furrow must be drawn along the crown of every ridge. In the bottom of this furrow, a little rough dung may be laid, and the potatoe plants dropped above the dung, and covered by the plough going once along each ridge ; this is all that is necessary in planting.

When the potatoes begin to appear above ground, the alleys must be plowed, turning the earth to the rows, and going so near, as to cover the plants. When the plants appear again, the rows must be carefully cleaned with the hand-hoe, and the alleys plowed, turning the earth from the rows, into the middle of the alley. In that situation the field may remain, till the roots of the potatoes are every where breaking out in the open furrows, on each side of the rows ; then the alleys may be plowed a third time, turning the earth to the rows, and if any weeds at this time appear in the rows, they must be pulled out.

Hoeings

Hoeings after this are unnecessary for destroying the weeds, and improper, lest the young potatoes should be hurt.

When the husk that contain the seed, or the apple, as it is commonly called, is compleatly formed, the stalks may be cut down, and given to cows; the same use may be made of the supernumerary stalks pulled up, which may possibly ballance the expence of pulling and gathering. Milk cows have been tried with this food; they eat it very well, and it gives no bad flavour to their milk; perhaps it may not be proper to give them this food only, but they may have a considerable quantity of it once or twice a day without any danger.

The time of taking up potatoes depends upon the market. If nothing is in view but the largeness of the crop, they ought to stand till October, or rather as long as is convenient to have them taken up before the frost sets in, or the land becomes wet.

As the most expeditious way of planting potatoes is by the plough, so the most expeditious way of taking them up is likewise by the plough. Eight or nine persons attending the plough is sufficient for this purpose. After the field is once plowed, it ought to be harrowed, by which some potatoes will appear above ground, and when these are gathered, it should be plowed a second time. After all, some will be left, but these are either destroyed by the frost in winter, or when the land is plowed in the spring.

ARTICLE LVII.

SYSTEM of FARMING *successfully practised for several years,*

By the late EARL of BALCARRAS

ALL improvers, in order to succeed, must be well furnished with money ; and are not to be sparing of it upon all necessary occasions.

An able and honest overseer must be found ; and he must have sturdy able servants, ready to obey directions, which he had best be capable of giving himself.

The best instruments of all kinds must be had ; carts and wains with iron axletrees, ploughs, stronger and lighter, for the first and following plowings. Besides the common harrows, he should have harrows of five foot and a half square, with five bars, and the teeth three inches longer than the common ones : These are called Break-harrows ; and are drawn by two good horses : A triangular harrow is also needful : This should be made of strong wood ; the base five foot and a half broad, and another bar a foot and a half before it, with a bar near the point ; these must contain twenty four strong teeth. This is drawn by four oxen and two horses, and serves to break the ground after the second plowing when the ground is under fallow ; and is of excellent use, as it makes the subsequent plowings with the light ploughs go easily forward. A roller also must be had : This should be five foot and a half broad, made of ash or elm, fifteen inches diameter, with three rows of spakes fixed in it, as if for wheels, one in the middle, and one near each end : It should be covered with planks of plane-tree, two inches thick ; a box should be placed upon the top for the rider to sit upon ; and it is to be drawn by two good horses. It should be furnished with three shafts, to place the horses a-breast ; otherways the instrument will not turn without too much confusion upon

upon the ground. This instrument will roll near six acres in one day ; and a long experience satisfies me, that all crops are the better for it. Another set of harrows are also necessary for harrowing grass and turnip-seeds : These should be made very light, and six feet square, with six bars to contain teeth such as those of a garden-rake, and as close set together.

Horses and oxen must be procured, stronger than those used by the generality of our farmers, which have not strength for tilling deep enough for fallowing, or for the first plowings of the wheat grounds after harvest, that are designed for turnips in the spring. All my other plowings for grain are seldom more than four inches deep.

The half of my ploughs are drawn by four of the best oxen and two horses, the other half by three, sometimes four horses.

My farms consist of 650 acres, which paid L. 300 a year. Of these, 40 acres are in garden ground and plantations round my house ; 24 acres are occupied by an avenue to it ; 396 acres are in grass ; and 190 in tillage : the whole near inclosed ; the one half with stone and lime-walls, the other by double ditches faced with stone, and planted between. Twelve inclosures next my house, of ten acres each, are always, three of them in wheat, three in turnips, three in barley, with which I sow twenty pounds of red clover per acre for the following crop ; and the remaining three acres are kept in fallow, as a preparation for wheat.

Fallowing was little practised in Fife, till I began it ; and the method I follow is this : As the soil was foul and full of weeds, I seldom gave it less than six plowings ; the first always immediately after harvest ; the ground was then cross-plowed, and well harrowed with the break-harrow. The triangle went then over the whole, which made the after-plowings with light ploughs easy : After the last plowing,

plowing, I laid on about thirty bolls of flaked lime on each acre in little heaps, and had the same spread by hand; and the ground was then harrowed with the common harrows. In September or October, the wheat was sown and covered with a light furrow, so to remain till the spring, when it was carefully rolled, so soon as the ground was sufficiently dry. The ridges ought never to be above seven feet broad, and gathered up the last plowing with a good water-furrow.

The next crop is turnips, sown with about one pound to the acre: The half of my fields are sown with the green and red-top, the other with the Hertfordshire turnip, which continues longer good than any other. After the harvest is got in, I plow the wheat fields; and as soon as the ground is dry, I cross-plow and harrow with the break-harrow: If the ground is rough and cloddy, I roll it, then plow and harrow it: If it is still cloddy, I roll and plow again; for the soil must be thoroughly pulverized: the seed furrows must be plowed deep, as deep as the soil is good, and as straight as possible, and at the distance of three feet from each other. The dung must be laid in small heaps, out of the carts, near the furrows, and spread equally by the men in the furrows. About half the quantity of dung that is usually laid upon corn fields will suffice. About the middle of June the whole field must be tilled and the dung covered, and well harrowed: If the ground is dry, you must wait for rain; then the turnips are to be sown by the drill-plough; the Hertfordshire turnip ought to be the last sown. As soon as the rows of turnips are two or three inches sprung, they must be carefully hoed about nine inches from each other; and the plants that are to stand must be weeded and left single as much as possible. Then a light plough with two horses, or one, must be employed to throw the ground about three inches from each side of the rows, so to remain

main for eight or ten days ; then the ground to be returned as near the plants as they can without covering them : If the ground is weedy, this must be performed a second time. About half an acre of these turnips, if good, is more than sufficient to fatten a good ox. In feeding with turnips, the cattle ought to have half a stone of clover-hay each to supper them : The byres must be well cleaned twice a day, and the floor they lye upon made of smooth stones. I buy my oxen from August to October, put them upon my hay stubble or grass fields that are half eaten, till I put them up for the turnips. Those I buy from L. 6 to L. 8 price I find to answer best ; and I commonly sell about seventy or eighty of them in March or April for about L. 4 of profit each.

The next crop is barley. As soon as a turnip field is eaten, and the ground sufficiently dry, I plow it up as soon as other labour will permit, and bring four ridges into one. I plow again, and harrow well, but never plow for barley above four inches deep : A third plowing is commonly needful ; after which I sow and harrow, and then sow twenty pounds of red clover to each acre above it, and harrow it in well with the grass-feed harrow.

Here I must observe, that where fields are to be sown with grass-seeds for pasture only, the best method is to sow them without corn. Let the ground be tilled after harvest ; give it a cross plowing in the spring ; harrow it, and lay on about thirty bolls of lime on each acre, and harrow it in : about the end of June I plow with the light plough fur ; harrow and sow twenty pounds of white clover upon each acre : It must be well rolled ; and must not be fed but in dry weather for the first year : This method will give a stool of grass, which would not be so good for many years, if sown along with corn.

The next crop is the red clover, necessary for feeding the turnip cattle. About the middle of June I cut it :
As

As soon as the hay is made and removed, I till the ground for wheat, thereafter give it a cross plowing, then I put the triangular harrow on it; and sow the wheat in September under furrow; and roll it in the spring. When my ground comes to be in heart and good order, I often sow my wheat above furrow; which I find to be the best method after but once tilling the clover ground; and with but a light furrow, and it proves very well. I used to lime my wheat field every fourth year; but it made the crop often too tall, and apt to be laid down by winds and rain. I therefore found it better, to lime the turnip or barley fields every fourth year; and as the soil improves by this year's system, so I now lime the seldomer.

The other parts of my fields or farms, where I have no turnips, is differently managed. I plow and fallow as for wheat; upon the last plowing but one, I roll, and lay thirty bolls of flaked lime upon the acre in small heaps, which is spread equally: and the ridges are then gathered up with a light furrow to lye the winter. In the spring I sow barley on the winter-furrow, without tilling; as the winter frost and rain will have made some inches of the ground quite fine, I then harrow well with the break-harrow, and roll, which I find a very good practice.

The next crop is oats, necessary for the sake of the straw to feed the cattle; otherways I would chuse to have no oats.

The next crop is pease and beans, for which I give the ground a good furrow, and harrow well. I plow again with a lighter furrow, and drop in the seed by hand, intermitting every second furrow: Cover and roll well.

The next crop is wheat, and again fallow for barley as before.

By the constant practice of this system now for twelve years past, I have seldom done less, after all expences defrayed, than doubled the old rent; and several years much more.

A R T I-

ARTICLE LVIII.

*On the CULTURE of COLESEED,**By ARTHUR YOUNG Esq;*

Published by desire of the SOCIETY, for the encouragement of
Arts, Manufactures and Commerce.

Experiments on Coleseed.

THE trials I have made on this branch of culture, are not of that extent I could wish; but as they are accurate, and minutely registered, it is apprehended they may be of use to others who are inclined to attempt larger undertakings. With this view the following experiments are ventured to the eye of the Society: it is hoped they will excuse confined views, and a want (perhaps) of those *reflections and observations*, which modern writers of husbandry are famous for. The only object I ever had in matters of agriculture, is *experiment*. I insert some of my trials on this vegetable, but shall not trouble the Society with many remarks; they must make their own way, for I am not one of those who write ten observatory pages to one experimental period.

EXPERIMENT, No I.

*Culture, Expences, and Produce of half an Acre of Coleseed,
in two Divisions, 1765.*

COLESEED, wherever I have remarked the cultivation, has been sown for a crop of seed, as well as food of cattle, but often fed off with sheep, and afterwards reaped for the seed. It is usually sown in the manner of turnips; but I never knew any hoed even by those farmers that are nicest with the latter crop. It was this circumstance that first induced me to cultivate coleseed; to
discover

discover if I could gain better crops than common (for sheep) by means of a better than common culture.

The soil of this experiment is a loose woodcock brick-earth, and under that a white clay, the field hangs a little to the north.

Culture.

The land received the first tillage in Autumn 1764. In March 1765 plowed it again. In April again, and twice harrowed it. The second week in May it had its fourth earth, and was again harrowed. The beginning of June another plowing: and on the 23d it was all sown, after a fresh plowing, and harrowed in; the quantity of seed a pint and a half. The extreme dryness of the season, which destroyed almost all the turnips in the country, rendered this crop much worse than it would otherwise have been: the seed arose but indifferently and irregularly, in some perches many plants, and in others but few: respecting the grand division into two equal parts, this irregularity was not great. The last week in July one half was hand-hoed in the manner of turnips, and the other half left as managed by the common farmers, that is, had nothing done to it. The hoes were smaller than turnip ones. August the 4th, this operation was repeated. The effect was very visible in the superior luxuriance of the crop.

It was left until February, the middle of which month, the divisions were herded; and forty sheep turned into the commonly cultivated half. It lasted them exactly five days. They were then turned into the other rood, which lasted them five days. The field was then plowed up.

Account of the common rood.

	<i>Expences.</i>	<i>l.</i>	<i>s.</i>	<i>d.</i>
Six plowings at 1 s. (the labour)		0	1	6
Four harrowings		0	0	1½
Seed		0	0	4
Sowing		0	0	0¼

Carry over 0 2 0¼

Brought forward
Rent, tythe, and town-charges

l. s. d.

0 2 0 $\frac{1}{4}$

0 4 3

0 6 3 $\frac{1}{4}$

Produce.

l. s. d.

Keeping 40 sheep 2 days at 4 *d* per week
per sheep

0 3 4

Expences

0 6 3 $\frac{1}{4}$

Produce

0 3 4

Loss, 11 *s.* 9 *d.* per acre

0 2 11 $\frac{1}{4}$

The expences of my horses, and wear and
tear, this year, divided among all the
work performed, is, for plowing, 2 *s.*
4 $\frac{3}{4}$ *d.* per acre per earth: fix at this
rate are

0 3 7

The expences of harrowing four
times, at 4 $\frac{1}{2}$

0 0 4 $\frac{1}{2}$

0 3 11 $\frac{1}{2}$

Total loss, 1 *l.* 7 *s.* 7 *d.* per acre

0 6 10 $\frac{3}{4}$

Account of the hoed rood.

Expences.

l. s. d.

Six plowings

0 1 6

Four harrowings

0 0 1 $\frac{1}{2}$

Seed

0 0 4

Sowing

0 0 0 $\frac{3}{4}$

Two hand-hoeings at 7 *s.* per acre

0 3 6

Rent, &c.

0 5 6 $\frac{1}{4}$

0 4 3

0 9 9 $\frac{1}{4}$

Produce.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Keeping 40 sheep 5 days, at 4 <i>d.</i> as before	0	9	2
Expences	0	9	9 $\frac{1}{4}$
Produce	0	9	2
Loss, 2 <i>s.</i> 5 <i>d.</i> per acre	0	0	7 $\frac{1}{2}$
Plowing and harrowing as	0	3	11 $\frac{1}{2}$
Total loss, 18 <i>s.</i> 3 <i>d.</i> per acre	0	4	6 $\frac{1}{4}$

O B S E R V A T I O N S.

This trial is no great encouragement to cultivate cole-feed, but the year was very unfavourable, and had it been otherwise, determinate conclusions ought never to be the consequence of single, or a few experiments. Repeated trials, in various seasons, and many soils, alone authorize absolute decisions.

The reason I plowed up this crop, was my intention of not letting it stand for feed; had that been the design, it must not have been fed much later; and as I made this trial to discover profit of feeding colefeed, that is, for feed, I thought it necessary not to let it stand longer. I should remark, that a second feeding, in time for barley or oat sowing, I know from observation to be a mere nothing.

Comparison.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Loss by the unhoed	1	7	7
—————hoed	0	18	3
Superiority per acre of the latter	0	9	4

This proves sufficiently the great benefit of the practice, besides the cleaning the land, which is yet more. But I should

should remark, that the hoeing, if it was a general practice, would be done much cheaper. Labourers always impose, when their work is uncommon.

EXPERIMENT, No II.

Culture, expences and produce of four acres, 1765.

This field hangs to the north, and the soil is a strong clay.

Culture.

The last crop was oats, the stubble of which was plowed in October 1764, and the field well water-furrowed. In April 1765, it received the first Spring-plowing. In May was stirred twice more, and harrowed once. June 19th, plowed it again; July 1st again, and harrowed in the seed. The field was then well water-furrowed.

The excessive drought prevented the crop from rising as it ought to have done, but yet the plants were more numerous than in some turnip fields adjoining. I was induced therefore, as the land had been well prepared, to let it stand.

January 24th, I turned into it fifty sheep, and three two-year-old heifers; it kept them just three weeks.

Expences.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Six plowings	1	4	0
Two harrowings	0	1	0
Two water-furrowings	0	8	0
Seed	0	1	4
Sowing	0	1	0
	1	15	4
Rent, &c.	3	8	0
	5	3	4

Produce.

Produce.

Keeping fifty sheep three weeks at 4 *d.*
 Ditto three young cattle at 1 *s.* 3 *d.*

<i>l.</i>	<i>s.</i>	<i>d.</i>
2	10	0
0	11	3

3	1	3
---	---	---

Expences
 Produce

5	3	4
3	1	3

2	2	1
---	---	---

Plowing at 2 *s.* 4 $\frac{3}{4}$ *d.*
 Harrowing at 4 $\frac{1}{2}$ *d.*

<i>l.</i>	<i>s.</i>	<i>d.</i>
2	17	6
0	3	0

<i>l.</i>	<i>s.</i>	<i>d.</i>
3	0	6

Loss, 1 *l.* 5 *s.* 7 $\frac{3}{4}$ *d.* per acre

5	2	7
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OBSERVATIONS.

The greatness of this loss is certainly much owing to the dryness of the season. But such mischances are never to occasion a neglect of trials that are subject to them: all vegetables are liable to such evils, and if one species withstands the enemy better, upon the average of a long period than another, it is an advantage which ought by no means to be overlooked. Experiments, registered only in favourable years, are useless, because unfair.

The sheep and young cattle, both affected this food much; but the latter not so soon as the sheep.

EXPERIMENT, No III.

Culture, expences, and produce, of half an acre, in two divisions, 1766.

The soil the same as in the last experiment; and also the exposure. *Culture.*

Culture.

In October 1765, the first plowing was given; in March 1766, the second; in April and May two more. The first week in June harrowed it; again in the second; plowed it then for the fifth time, and sowed it, and harrowed in the seed. The plants rose extremely favourable. The 9th of July hand-hoed one rood for the first time; and again the 24th. The effect of these hoeings was striking.

September 9th, viewed this experiment; the hoed part is as thick as the other, and much more luxuriant, but very few weeds, the other full of them.

March the 17th, hurdled the divisions, and fed them off with sixty sheep. The unhoed half lasted them six days. They were then turned into the other, which kept them just eight days. N. B. They were taken out of nights, and lodged in a small pasture near the field.

*Account of the rood commonly managed.**Expences.*

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Five plowings	0	1	3
Three harrowings	0	0	1 $\frac{1}{4}$
Seed	0	0	5
Sowing	0	0	0 $\frac{3}{4}$
Rent, &c.	0	1	10
	0	4	3
	0	6	1

Produce.

Keeping 60 sheep six days at 4d.	0	16	10 $\frac{1}{2}$
Expences	0	6	1
	0	10	9 $\frac{1}{2}$
Plowing,			

	<i>l.</i>	<i>s.</i>	<i>d.</i>	<i>l.</i>	<i>s.</i>	<i>d.</i>
Plowing, at 2 <i>s.</i> 5 $\frac{1}{4}$ <i>d.</i>	0	3	0 $\frac{1}{2}$			
Harrowing, at 4 $\frac{1}{2}$ <i>d.</i>	0	0	3 $\frac{1}{4}$			
				0	3	3 $\frac{3}{4}$
Profit, 1 <i>l.</i> 9 <i>s.</i> 11 <i>d.</i> per acre				0	7	5 $\frac{3}{4}$

Account of the hoed rood.

Expences.

As before	0	1	10
Two hand-hoings at 7 <i>s.</i> and 6 <i>s.</i>	0	3	3
Rent, &c.	0	4	3
	0	9	4

Produce.

Keeping 60 sheep eight days at 4 <i>d.</i> per week	1	2	6
Expences	0	9	4
	0	13	2
Plowing and harrowing as before	0	3	3 $\frac{3}{4}$
Profit, 1 <i>l.</i> 19 <i>s.</i> 5 <i>d.</i> per acre	0	9	10 $\frac{1}{4}$

COMPARISON.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Profit by the hoed	1	19	5
Ditto by the unhoed	1	9	11
Superiority of the former per acre	0	9	6

OBSERVATIONS.

These crops are both profitable, but the hoeing is evidently the superior method in the crop itself, as well as in the benefit the land receives.

The sheep are very fond of this crop, which agrees perfectly well with them, and the young lambs thrive very much.

much. I proposed keeping it longer, but wanted the land for barley, which should never be delayed on any account.

A circumstance happened relative to these crops, which is worth attention: An old sow found her way to them before they were fed off, and visited them every day, feeding very heartily, and coming regularly home at night; I let her alone, to observe the effect, which shewed the food to be very wholesome and feeding; for she throve well and neglected her other food: this hint pursued further in another experiment.

E X P E R I M E N T, No IV.

Culture, expences, and produce of half an acre, in four divisions, 1766.

This piece is in the same field as the last experiment. The soil and exposure the same.

Culture.

The first plowing was given in Autumn 1765. In March 1766, plowed the next time. In April plowed and harrowed; in May plowed and harrowed. The first week in June stirred it again; the 27th again; and struck it by this plowing into four parts.

No 1. Harrowed in the seed broad-cast, for the common management.

No 2. Harrowed in the seed broad-cast, designed for hand-hoeing.

3. Thrown on to five feet ridges, and drilled a double row one foot asunder each.

4. Left flat, and drilled in equally distant rows two feet asunder.

July

July 15th, hand-hoed, No 2, 3, 4. The 21st, horse-hoed No 3. by throwing a furrow *from* the plants. The 23d, hand-hoed it again, setting the plants out eighteen inches from each other in the rows. August 6th, hand-hoed No 2, 3, and 4. The 12th, horse-hoed No 3. again, throwing the mould to the plants. The 22d, another horse-hoeing, reversing the last. September 2d, another, throwing the earth back to the plants.

The end of March, I mowed No 1. first, and spread the crop upon a piece of dry grass land; I then, in pursuance of the Item I had in the last experiment, turned fifteen hogs about three parts grown into the field: they took at once to the coleseed, and fed very heartily upon it. They were kept to it, and it lasted them just three days.

No 2. Lasted them seven days.

3. two days.

4. five days

The hogs throve very well on this food, and none of it was wasted.

Account of No I.

Expences.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Six plowings	0	0	9
Three harrowings	0	0	0 $\frac{1}{4}$
Seed	0	0	3
Sowing	0	0	0 $\frac{1}{2}$
Mowing, carting, and spreading	0	0	5
	0	1	6 $\frac{3}{4}$
	0	2	1 $\frac{1}{2}$
	0	3	7 $\frac{3}{4}$
	<i>Produce.</i>		

Rent, &c.

Produce.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Keeping 15 hogs three days at 3 <i>d.</i> per hog per week	0	1	6 $\frac{3}{4}$
Expences	0	3	7 $\frac{3}{4}$
Produce	0	1	6 $\frac{3}{4}$

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Plowing, at 2 <i>s.</i> 5 $\frac{1}{4}$ <i>d.</i>	0	1	9 $\frac{3}{4}$
Harrowing, at 4 $\frac{1}{2}$ <i>d.</i>	0	0	1 $\frac{1}{2}$
Carting, at 6 $\frac{1}{2}$ <i>d.</i>	0	0	0 $\frac{3}{4}$
	0	2	1
	0	2	0
Lofs, 1 <i>l.</i> 12 <i>s.</i> 8 <i>d.</i> per acre,	0	4	1

Account of No II.

Expences.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
As before	0	1	6 $\frac{1}{4}$
Two hand hoeings at 5 <i>s.</i> and 5 <i>s.</i> 9 <i>d.</i>	0	1	4
	0	2	10 $\frac{1}{4}$
Rent	0	2	1 $\frac{1}{2}$
	0	4	11 $\frac{3}{4}$

Produce

Keeping 15 hogs 7 days	0	3	9
Expences	0	4	11 $\frac{3}{4}$
Produce	0	3	9
	0	1	2 $\frac{3}{4}$
Plowing, &c. as before	0	2	0
	0	3	2 $\frac{3}{4}$
Lofs, 1 <i>l.</i> 5 <i>s.</i> 10 <i>d.</i> per acre	0	3	2 $\frac{3}{4}$

Account of No III.

Expences.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Six plowings	0	0	9
Three harrowings	0	0	0 $\frac{3}{4}$
Carry over	0	0	9 $\frac{3}{4}$

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Brought forward,	0	0	9 $\frac{3}{4}$
Seed	0	0	1
Drilling, at 3 $\frac{1}{2}$ <i>d.</i>	0	0	0 $\frac{1}{2}$
Three hand-hoeings at 3 <i>s.</i> 6 <i>d.</i> 3 <i>s.</i> and 2 <i>s.</i> 6 <i>d.</i>	0	1	1 $\frac{1}{2}$
Four horse-hoeings at 8 <i>d.</i>	0	0	4
Mowing, carting, &c.	0	0	4
	0	2	8 $\frac{1}{4}$
Rent	0	2	1 $\frac{1}{2}$
	0	4	10 $\frac{1}{4}$

Produce,

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Keeping 15 hogs 2 days	0	0	11 $\frac{1}{2}$
Expences	0	4	10 $\frac{1}{4}$
Produce	0	0	11 $\frac{1}{4}$

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Plowing	0	1	9 $\frac{3}{4}$
Harrowing	0	0	1 $\frac{1}{2}$
Drilling, at 3 <i>d.</i>	0	0	0 $\frac{1}{2}$
Horse-hoeing, at 1 <i>s.</i>	0	0	6
Carting	0	0	0 $\frac{3}{4}$
	0	2	6 $\frac{1}{2}$
Loss, 2 <i>l.</i> 11 <i>s.</i> 8 <i>d.</i> per acre	0	6	5 $\frac{1}{2}$

Account of No IV.

Expences.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Six plowings	0	0	9
Three harrowings	0	0	0 $\frac{3}{4}$
Seed	0	0	2
Drilling, at 4 $\frac{1}{2}$ <i>d.</i>	0	0	0 $\frac{1}{2}$
Two hand-hoeings, at 4 <i>s.</i> 9 <i>d.</i> and 5 <i>s.</i> 3 <i>d.</i>	0	1	3
Mowing, carting, &c.	0	0	5
	0	2	8 $\frac{1}{4}$
Rent	0	2	1 $\frac{1}{2}$
	0	4	9 $\frac{3}{4}$

Produce,

Produce

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Keeping 15 hogs 5 days	0	2	6
Expences	0	4	9 $\frac{3}{4}$
Produce	0	2	6
	0	2	3 $\frac{3}{4}$
Plowing, harrowing, and cart- ing, as in No 1.	0	2	0
Drilling, at 3 $\frac{1}{4}$ <i>d.</i>	0	0	0 $\frac{1}{2}$
	0	2	0 $\frac{1}{2}$
Loss, 1 <i>l.</i> 14 <i>s.</i> 2 <i>d.</i> per acre	0	4	4 $\frac{1}{4}$

R E C A P I T U L A T I O N .

	<i>l.</i>	<i>s.</i>	<i>d.</i>
No 1. Broad-cast unhoed, loss per acre	1	12	8
2. Ditto, but hoed ditto	1	5	10
3. Horse-hoed ditto	2	11	8
4. Drilled in equally distant rows, ditto	1	14	2

From this view the comparative advantages (or rather disadvantages) of these methods are pretty clearly seen.

O B S E R V A T I O N S .

The ill success of this experiment is to be attributed to more causes than one; the poverty of the crops in point of quantity, and the vegetable not being of that substantial nature which goes far in the feeding of the cattle: and yet I think 3*d.* a-week a fair price for hogs that rise when full grown to about ten stone (14 *lb.*) From viewing the field, I should have thought the hoed broad-cast crop would have turned out better; but it never carried near so good an appearance as Experiment No III. But whatever idea is formed of Coleseed in general from this trial, the comparative part of it is very decisive: drilling is evidently an improper method to cultivate it; and horse-hoe-

ing

ing excessively unprofitable, the expences being very great, and for worse than no purpose. The beauty and luxuriance of the plants in these rows were great, but the superior quantity of the others much more than ballanced this circumstance.

EXPERIMENT, No V.

Culture, expences, and produce of half an acre, in three divisions, 1767.

The soil, exposure, &c. the same as in the preceeding experiment.

Culture.

This piece received its first tillage in October 1766. In November it was stirred again. The third earth was given in March; the fourth the beginning of April; the fifth, the latter end of the same month, when it was harrowed. The 6th of May plowed it and harrowed it again. Harrowed it again on the 16th. The 28th plowed it again, striking it into three parts, and harrowed all. The 29th sowed No 1. with coleseed broad-cast. No 2. with turnips broad-cast.—No 3. was planted with cabbages, the Battersea fort, in rows four feet asunder, and three feet in the rows, the plants of which had been raised in the garden.

June 15th, all three were hand-hoed. The 27th, horse-hoed the cabbages, and hand-hoed the turnips and coleseed again. July 18th, the second horse-hoeing. The 28th, the third. August 4th, hand-hoed them again. August 6th, the fourth horse-hoeing. All three crops flourished exceedingly. October 5th, cut them all, and weighed the produce.

No 1. weighed 17 cwt. or	tons.	cwt.	lb.
per acre	5	0	0
2. 3 ton 18 cwt.	21	18	0
3. 4 13	27	18	0
	They		

They were then given, upon a bare grafs field, to two large oxen, and two dry cows.

No 1. Lasted them two days, which, at 5s. a-week for the two oxen, and 3s. 6d for the two cows, comes to 2s. 6d. or, per acre,	l. s. d. 0 15 0
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No 2. Lasted them a week, which, at the above prices, comes to 8s. 6d. or, per acre,	2 11 0
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No 3. Lasted them just a week and half, which, at the above prices, comes to 1l. 1s. 3d. or, per acre	6 7 6
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Account of No I.

<i>Expences.</i>	<i>l. s. d.</i>
Seven plowings	0 1 2
Four harrowings	0 0 1
Seed	0 0 2
Sowing	0 0 0 $\frac{1}{2}$
Two hand-hoeings at 6s. and 5s. per acre	0 1 10
Mowing, carting, and spreading	0 0 6
Expences	0 3 9 $\frac{1}{2}$
Rent, &c.	0 2 10
	0 6 7 $\frac{1}{2}$

<i>Produce.</i>	<i>l. s. d.</i>
Food as above	0 2 6
Expences	0 6 7 $\frac{1}{2}$
Produce	0 2 6
	0 4 1 $\frac{1}{2}$

	<i>l. s. d.</i>	<i>l. s. d.</i>
Plowing at 2s. 5 $\frac{1}{4}$ l.	0 2 10	l. s. d.
Harrowing at 4 $\frac{1}{2}$ d.	0 0 3	
Carting, at 6 $\frac{1}{2}$ d.	0 0 1	
		0 3 2
Loss, 2l. 3s. 9d. per acre		0 7 3 $\frac{1}{2}$

Account of No II.

Expences.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Seven plowings	0	1	2
Four harrowings	0	0	1
Seed	0	0	1 $\frac{1}{2}$
Sowing	0	0	0 $\frac{1}{2}$
Two hand-hoeings, at 4s. and 2s. 6 d.	0	1	1
Drawing and carting, at 5s. per acre	0	0	10
Rent	0	3	4
	0	2	10
	0	6	2

Produce.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Food as above	0	8	6
Expences	0	6	2
	0	2	4

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Plowing	0	2	10
Harrowing	0	0	3
Carting, at 3 $\frac{1}{4}$ d. per load	0	1	0 $\frac{1}{2}$
The above remainder			
	0	4	1 $\frac{1}{2}$
	0	2	4
Profit, 10s. 9d. per acre	0	1	9 $\frac{1}{2}$

Account of No III.

Expences.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Seven plowings	0	1	2
Four harrowings	0	0	1
Seed, at 5s.	0	0	10
Digging the seed-bed and sowing	0	0	2
Planting at 5s.	0	0	10
Two hand-hoeings at 5s. and 2s.	0	1	2
Carried over,	0	4	3

	Brought over,	0	4	3
Four horse-hoeings at 9d.		0	0	6
Cutting and carting at 5s.		0	0	10
		0	5	7
Rent, &c.		0	2	10
		0	8	5

Produce

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Food as above	1	1	3
Expences	0	8	5
	<i>l.</i>	<i>s.</i>	<i>d.</i>
	0	12	10
Plowing	0	2	10
Harrowing	0	0	3
Four horse-hoeings at 1s. 2d $\frac{1}{2}$.	0	0	9 $\frac{1}{2}$
Carting, at 3 $\frac{1}{4}$ d.	0	1	5 $\frac{1}{2}$
	0	5	4
Profit, 2l. 5s. per acre	0	7	6

C O M P A R I S O N.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Profit by cabbages	2	5	0
Loss by turnips	0	10	9
Cabbages the better by	2	15	9
Profit by cabbages	2	5	0
Loss by coleseed	2	3	9
Cabbages better by	4	8	9
Loss by coleseed	2	3	9
Ditto by turnips	0	10	9
Turnips better by	2	14	6

O B S E R V A T I O N S.

The loss on this turnip crop may surprize many members of the Society ; but I believe the general idea of profitable

fitable crops (like most other *general* ideas in husbandry) is often fallacious for want of accurate accounts. But I have raised much greater crops than this, and made them go much farther by stall feeding. The advantage in the improvement of the grass field cannot be taken into the account.

Coleseed makes a very indifferent appearance here. The cabbages did not near equal some other crops I have had at various times, but they are much superior to the other vegetables.

All three crops would have improved, had they stood longer, (although they were sown very early); but the comparison remains the same. The cabbages, however, would have decayed sooner than either of the others.

To discover which food was most agreeable to cattle, I took a cabbage, three turnips, and a bundle of coleseed, and carried them to another cow: She smelt of all, and then bit the turnip; next she bit the cabbage, and eat it up; and then she eat up the turnips, and, lastly, the coleseed.

I do not offer this as any satisfactory account, but as a hint that should be carried further.

COROLLARIES *to be drawn from these Experiments.*

- I. Coleseed is a nourishing and wholesome food, for oxen, cows, sheep, and hogs.
- II. The quantity of its produce (under the preceeding management) is inconsiderable, and not, upon an average, sufficient to answer the expences of culture.
- III. The best culture is that of sowing broad-cast and hand-hoeing, as in the turnip husbandry; without hoeing it is much worse, and drilled and horse-hoed, naught.
- IV. Turnips are much superior in quantity and value of produce.
- V. Cabbages are greatly superior to it.

[*To be concluded in our next.*]

ARTICLE LIX.

*A LETTER to the PUBLISHER, accompanied with
HUSBANDRY ANATOMISED.*

SIR,

I lately fell upon a treatise entitled Husbandry Anatomised, published at Edinburgh in the year 1697, by James Donaldson. The account the author gives in his preface of himself and his work, is, That he was bred in the country till he was upwards of twenty years of age; and his father keeping servants and cattle for labouring a part of these lands which heretofore belonged to him, he had opportunity to acquire as much knowledge in husbandry affairs, as was practised in that part of the country. When it pleased God to call the Prince of Orange to relieve these kingdoms from the imminent danger they then stood in, he judged it his honour and duty to concur with such a glorious and laudable undertaking; and according to his ability testified his affection to the cause several ways, particularly by levying a company of men for his majesty's service, with which he served in the Earl of Angus's regiment. When he returned to the country, he began to reason thus with himself; "What? Have I learned nothing from all that I have seen and heard, whereby I can be useful to myself and the common-wealth?" At length, considering, that he had some experience of the way and manner of labouring ground in this country; and had seen the way of managing it in other places, which is generally done to greater advantage; he began to try, what might be the causes, why there is such difference of increase in one place from what there is in another: and found, that it does not proceed altogether from the difference of climate or primitive constitution of the earth, but from the difference of management. These he has compared together, and shown the difference of profit arising from what was the common husbandry of Scotland at that day, and the more improved method he proposes.

It is very true, that agriculture is now arrived to greater perfection, and is more generally known among our farmers, than it was in this gentleman's days, and the publishing it now may be esteemed of little use: But, in the first place, it is a matter of curiosity to see, that agriculture was not at that early period totally neglected among us; and that the slow progress it has made must be ascribed to other causes, which are pointed out in the introduction to your useful work: And I am convinced, had due regard and attention been paid to this piece at its first publication, we would not at this day have had reason to complain of so many unprofitable waste grounds through the country, or of many farms, the greatest part of which to this day are no better than unprofitable wastes. And, 2dly, As there yet remain so many farms in the abject situation that Mr DONALDSON was familiar to, and the methods he lays down are but a more improved state of the system of farming practised by such farmers, they will more easily be convinced of the propriety of his advices, and will be readier to practise them; than it can be supposed they will be, with respect to those more improved methods of agriculture, now become familiar to a great part of the country.

This has induced me to abridge this treatise, leaving out every thing that was extraneous to the subject, in hopes, that it may be of some service to such of my brethren as stand most in need of it. The calculations are agreeable to the prices of grain and other country product at that time; none of which I thought myself at liberty to alter: And as they are made in Scots money, they will be more agreeable to our country people, and better understood by them. If you think the publication of it in your Farmer's miscellany will be of service to my countrymen, you are welcome to it; and if I have the satisfaction to learn, that even one man has benefited by it, I shall think my labour well bestowed.

I am, S I R, &c.

Clackmannan-shire, }
25th July 1774. }

HUSBANDRY ANATOMIZED: *Or, An Enquiry into the present manner of Tilling and Manuring the Ground in Scotland, for the most part; and several Rules and Measures laid down for the better Improvement thereof; insomuch, that one third more Increase may be had, and more than a third of the Expence of the present way of Labouring saved.*

By JAMES DONALDSON.—Edinr. 1697.

WHEN Almighty God created the world by the word of his power, he could have made man to have lived without food, as well as he did the Angels: Or have made the earth to have brought forth all manner of food for him, without labour or Industry, as it doth for cattle and creeping things: But so it was, that he who is infinite in wisdom, saw it meet to assign to man a daily exercise in earning his food and raiment; whereby he is not only diverted from following some bad practice, but also that he may thereby see his great frailty, in that he is not able to live without daily subsistence and refreshment from creatures inferior to himself; and that he may thereby learn to know his great need of spiritual nourishment to his soul, in as much as it is more precious than the body, together with many other profitable lessons.

No doubt, if man had continued in the state of Innocence, his labour had been rather a pleasure, than a toil; as may be gathered from the sentence pronounced against Adam; when it is said, "From thenceforth by the sweat of his brows, he should earn his bread, until he should re-
"turn into the dust." It is plain enough, it had not fared so with him, but for his transgression: And upon Cain's transgression the earth is again cursed, that thenceforth it should not yield its strength. What wonder, tho' before this time it had become a barren wilderness, considering
the

the daily multiplied transgressions of the children of men, But this being extraneous to my purpose, and what I cannot decipher, I remit to the consideration of divines.

My present purpose is,

1. To take some general observations on the present constitution of the earth.

2. To lay down certain rules for bringing every kind of ground to a right temperature, so far as may be.

3. To enquire into the present method of manuring the ground, thro' most parts of this kingdom.

4. To lay down several rules for manuring it to greater advantage, tho' not inclosed.

5. To show, to how much greater advantage that may be done, by parking and inclosing.

6. To give some directions concerning stock keeping.

7. To do the same concerning planting.

8. How to sow several garden seeds and roots.

Lastly, I shall answer what objections may be framed against any of my propositions.

CH A P I.

Of the Earth's constitution in general.

Notwithstanding, there is no Effect but from some certain Cause, yet there be many things true in effect, whereof we do not well know the cause. I hope therefore the reader will not disregard my propositions, where the fact is evident, tho' I cannot give a philosophical account of the cause.

It is allowed, that in some places the earth is moist and cold, in others hot and dry. Some inscribe this to the influence of the Planets : But it cannot be supposed, that their influence can operate differently in the bounds of a mile of ground, in which we find one field hot and sandy, another cold clay ; a third marshy and boggy, a fourth dry heath, and

and the fifth a tolerable mixture of all these. These differences must therefore be referred to the primitive constitution.

Now, to bring each of these different kinds of ground to such a temperature, as to be in a condition to nourish any plant or seed, the superfluity of that quality which prevaleth must be removed, and that quality which is weak must be strengthened. For, as in human bodies there are a composition of the four elements, by the superfluity or deficiency of any one of which diseases are contracted; so in the earth, there is the like composition of qualities; and so far as heat, moisture, cold or dryness exceeds the bounds of a moderate temperature, so far it is diseased and rendered unfruitful.

I know some assert, that salt, or the hot quality that is in the earth, is the only cause of the growth of vegetables; and consequently that barrenness is owing to the want of this quality. I confess, where this quality is wanting altogether, barrenness cannot but ensue, and that this quality is that which is most frequently deficient in our cold climate; and moreover, tho' it be strengthened and assisted, yet by tilling and manuring the earth, it is extracted forth into the substance of grain and other vegetables, and so needeth frequently to be renewed. Notwithstanding all which, I am of opinion, there may be abundance of this hot or salt quality, where there is as much barrenness as any where else.

To confirm this assertion, I have seen a field fattened sufficiently with dung, yet, by reason of great drought, yielding small encrease, scarce a third of what it has done at other times: The cause surely was not for want of this hot or salt quality, but solely for want of moisture. Again, I have seen a field that wanted not enough of this hot quality, and, by excessive rains, after it has been tilled
and

and sown with good grain, has produced little besides weeds and thistles: I have also seen strong clay ground, where the clods remained firm and unbroken, not produce so much by far, as at other seasons, when, by the frosts in the winter, the clods have been mouldered down, tho' it was otherwise in no better condition. These things convince me, that the want of air, tho' there be a moderate temperature of the other qualities, hinders the groweth of vegetables: For tho' they want not air in the stalk, which is above ground; yet in this confirmed earth, the air cannot have free access to the root. Another thing which confirms me in this opinion is, that where trees grow close, and near the bottom of hedges, little or nothing grows: Moreover, I have seen where the bottom of a dung-hill has been plowed and sown, that round the borders the corn has been strong and good; but where most of the strength of the dung remained, little or nothing has grown; which evinces, that the excess of this hot quality, though there be a moderate temperature of all the rest, doth hinder fruitfulness.

It is observed, that valleys are generally more fertile than hills. This is accounted for from various causes, 1. Their being nearer the internal or central heat of the earth. 2. The reflex heat of the sun-beams from the higher surrounding grounds. 3. That the hills being more exposed to the air when in motion, which is much colder than when it standeth still; and the valleys being much sheltered from the violence of storms, they are kept so much the warmer; and consequently the more fertile. 4. The hills being steep, the rain runs presently off, so soon as it falls; and not only carries along with it that hot or salt quality that is in it; but if the ground be not well swarded, it carries part of the earth also away with it. On the contrary, as valleys lie near level, the rain cannot suddenly run off; but as it gets
time

time to sink and soak into the ground, the salt quality remaineth still, whereby the earth is much enriched. From hence it is evident, that it is heat chiefly that makes the valleys more fertile than the hills : It therefore follows, that if other ground can be warmed to the like degree, it may thereby be made as fertile. This is what I shall attempt to give some directions for in what follows : And shall here observe, that it may be brought about in two ways ; first by assisting the internal heat ; and secondly by restraining the external cold.

C H A P. II.

How to bring every kind of Ground to a right temperature, so far as may be.

Now, like a skilful physician, after finding out the disease, let us prescribe the remedy, by showing what kind of nourishment or medicine is required to refresh the ground, or bring it to a temperate constitution

Dung of all sorts, particularly dung of cattle, vegetables of all kinds if fully rotted, ashes, lime, marle, sea-ware, are the great means for this end : some of them are stronger than others, and each of them proper to be applied to different kinds of ground.

1st, Marshy ground, if it be plowable, should be made in high ridges, and sheep or horse dung is fittest for it. If it be so moist, that it cannot be plowed, draining the water off by trenches or ditches, and strowing it with coal or wood-ashes, will much help the growth of good grafs, and destroy rushes or any other hurtful weeds.

2^{dly}, Where the earth is sandy and hot, it should be fattened with cow-dung or marsh earth ; for as its constitution is too hot already, dung of a contrary quality must be applied. But if it be excessive hot, it can hardly be made fertile, unless a great quantity of clay or marsh earth be laid

laid on it, the expence of which will exceed the profit. In that case, I know nothing better than to take what grass it produceth of itself, and not spend seed and labour in vain: For though in a wet season it may bear a pretty good crop, yet seeing a drought may as readily happen, it is safer to bestow expence on other ground, where more certain profit may be expected.

3dly, Strong clay ground, the nourishment most proper for which is horse or sheep dung. This kind is capable of as much improvement as any whatsoever: But as there are two maladies to be removed, cold and astringedness or hardness, especially when a dry summer follows a wet spring, besides the dung, take sea-sand or other sandy earth, and spread it as dung: This will help to keep the ground open, and also mitigate the cold. Another thing that makes this ground open and tender is fallowing; and also sowing it with pease or beans, which should be sown every third or fourth year at least.

4thly, The next kind is the moorish earth, wild and overgrown with heath. This Shrub groweth only on cold dry ground, where scarce any thing else can grow: Yet by removing that cold dead light earth that is on the surface where the heath grows, the soil may be made pretty fertile. The manner of managing this kind of ground is this: It is dug up in turfs, which being dried, they are gathered in small heaps and burnt; the ashes are spread in September or October; then sow it with wheat or rye, and plow it down with a light fur. The first year's crop will do more than reward the labour; and ever after, it will be fit for grain or pasture, as your other ground.

The turfs are cut in two methods; either by a hoe, striking the turf on its four sides, and so digging it up; or by a plough made for the purpose, whereby the ground is slit at distances of about a foot from one another; then

crossing

crossing at the same distances, all the edges of the turf are cut, so that they need be only cut at the bottom. In the last method, where the bottom of the turf only is to be cut, eight men may prepare an acre in a day ; but in the first method, they will not do half an acre. You may cut the ground either with the common plough, by lengthening the coulter three or four inches lower than the sock ; or to make a slype after the common manner, only add a cross-beam, and therein place two or three coulters, providing they be thin and of good mettle : lay a weight on the slype ; and it will slit the ground as deep as the point of the coulters go.

C H A P. III.

How to manage the Ground to better advantage, though not inclosed.

But as generals are not so convincing as descending to particulars, I shall compare the present way of managing the ground with that which I am now to propose. But as grounds differ much in degrees of richness, it may be said, the instance I give cannot be a rule for managing all sorts of grounds. Yet thereby any person may know, how to manage every kind of ground : For if the ground is naturally fertile, or lying near any place where dung can be had, more land may be taken into dunging ; and where the ground is less fertile, or small opportunity of getting dung, then less ground must be taken into dunging, than what I propose. In a word, it is a general rule, to dung no more than can be dunged sufficiently,

I shall suppose a farmer to have a tack of threescore acres at 300 merks, or L. 16 - 13 - 4. This is commonly divided into two parts ; one third, croft ; and two thirds, outfield. The croft is usually divided into three parts ; one third sown with barley, which is always dunged that

year; one third oats, and the other third pease. The outfield is divided into two parts; the one half oats, and the other half grafs, two years fucceffively.

The product of this farm in corn may be fupposed to be four bolls for each acre of croft, and three for each acre of outfield.

Let us next examine, what profit the farmer makes on his cattle. Befides four horfes, which are ufually kept for plowing the land, ten or twelve molt are commonly kept upon fuch a farm as this. The twenty acres of grafs cannot be fupposed to be very good, as it does not lye above two years, and cannot be well fwarded. Little profit therefore can be had of the cattle; two or three ftones of butter is the moft that can be expected of the cows, and not above two queys brought up each year. The profit from breeding young horfes, cannot be counted on; for if he keeps up his flock by his own breeding, it is very fair. The whole product of his cattle cannot then be reckoned above fifty merks, or, L. 33 - 6 - 8.

The whole product will ftand thus,

20 acres of croft at 4 bolls, is	80 bolls
20 acres of outfield at 3 bolls	60
	140 bolls

which reckoning the price of victual, one year with another, at L. 5 Scots per boll is	L. 700
20 acres of grafs yields of profit on his cattle	33 6 8

Total Product,

L. 733 6 8

The expence of management comes next to be confidered:

ed: The first cost of the stocking may be about L. 800 or L. 900, the interest of which should be stated in the first place: But this I shall omit.

The produce as above stated is		L. 733	6	8
The rent is	200			
Seed reckoned 40 bolls, being a boll to the acre, at L. 5 per boll	200			
Maintenance of the family, reckoned to 40 bolls	200			
For the horses I allow 16 bolls	80			
		L. 680	0	0
Remains		L. 53	6	8

Which is all that the farmer has to pay his servants wages, and furnish cloaths and other necessaries to himself and family, excepting the little industry by spinning or otherways to be made by his wife and maid. Now, he cannot labour the farm with less than two servants and a maid, besides a herd boy in summer, and the additional servants required in harvest; for which the above ballance must be absolutely insufficient.

No more servants and horses are requisite to labour one half more ground, that is thirty acres, in all 90. And if only the product, according to their proportions, was equal, then the expence of seed, and labouring of these additional thirty acres, will be wholly saved, which of itself is a considerable profit. But I shall show, that not only this expence may be saved, but the product will be considerably greater.

These 90 acres, I treat thus: 66 I set apart for outfield, which is divided into three parts; two thirds I leave in grass, and one third is plowed for three years only; thus every third is plowed three years, and lyeth six successively.

Of

Of the other 24 acres, I make two of them into a garden or orchard; half an acre thereof I plant with cabbage and kail, and sow with roots for family use; the other acre and half I leave in grass, and plant the whole with fruit trees, at the distance of 30 foot, which hinders not the growth of the grass or herbs beside them; and in 10 or 12 years much benefit may be had from the fruit.

The 22 acres that remain with half an acre from the outfield, I divide into five parts, of four acres and a half each. One of these I dung the first year for barley; the next year I sow it with wheat; the third with pease or oats; the fourth with oats or pease; and the fifth year I leave it in grass, or if I think fit fallow it. Thus I have four acres and a half dunged every year, for which there is dung in abundance, because a far greater number of cattle can be kept on this farm than on the former, having three times as much grass; for though there be not three times as many acres, yet it will be better swarded by lying six, whereas in the other it lay but two years. And as six or seven acres of the former were dunged every year, the present four acres and a half will have a far greater allowance.

Each acre of this croft, so well dunged, may be allowed to produce eight or ten bolls; but I shall reckon only seven bolls; and the outfield four bolls, which, after lying six years, is not unreasonable, seeing I allowed three to the outfield of the former farm, which had layn but two years.

The

The product will stand thus,

Outfield 22 acres, at 4 bolls per	
acre	88 bolls
Croft 18 acres, at 7 bolls per acre	126
	214

Which at L. 5 per boll is L. 1070
 But a fourth part of the croft being
 sown with wheat, we may reckon
 on 24 bolls, besides its own seed,
 which is at least a crown per boll
 better than other grain ; therefore
 add

72

Total produce of grain L. 1142

As to the stock of cattle to be kept ; on the former farm, four horses, and ten or twelve nolt was the number, though there was three times as much grafs as on this. Now, I shall not endeavour to augment the number, so much as to mend their condition ; for as I formerly observed, our cattle are generally half starved, which keeps them both small and lean. Let us therefore keep here only two horses, four oxen, eight or ten milk cows and a bull. We may reckon six calves every year : the stock of young cattle will come to be, six calves, six of a year old, and six of two years old ; and when they come to be three years old, they come into the account of cows or oxen. Now, as there are in grafs forty-four acres of out-field and four and a half acres of croft, and the grafs of the orchard, which I reserve for hay to give the cattle when sick, or for the sheep in a storm, I may well keep forty or fifty sheep besides.

Of the 10 milk cows, there may be made 16
 or 20 stones of butter at L. 2 : 18 per stone L. 46 8 0
 Three oxen and three cows will be to dis-
 pose of every year, and in respect they will

Carry over L. 46 8 0

Brought over L. 46 8 0

be better fed than cattle commonly now
are, in regard the pasture is not overlaid,
I can sell four of them at Hallow-day at
L. 18 each

72 0 0

Two of the oxen I feed till February or
March, having fodder in plenty, and sell
them at L. 30 each

60 0 0

On the horses I reckon neither profit nor
loss : Of the sheep we may reckon 20 to be
brought up every year ; so that 20 of the
old ones may be sold, 8 of the weakest at
Hallowday at 40 shillings a piece

16 0 0

And 12 of the best I put into the orchard
and feed them there till Candlemas,
when they may be sold at L. 4 4,— the
piece

50 8 0

The wool may be reckoned at

36 0 0

Besides I have in my orchard four or five
bee-hives, which may be kept at little
or no expence, and may yield yearly

24 0 0

The half acre of garden ground, which I
have in herbs and roots, may well save 12
or 16 bolls of grain in the maintainance
of the family ; but I shall reckon for it
only

50 0 0

To this add the produce of the victual

1142 0 0

L. 1496 16 0

The produce of the former farm was only

733 6 8

Difference of profit

L. 763 9 4

The expence of labouring and seed is the
same in both ; for seeing I labour but 40
acres in each, the same number of servants
and quantity of seed answers both. But
as I have 30 acres of more ground than in
the former, the rent of these 30 acres at
the same rate is

100 0 0

And as the landlord will probably
give me some encouragement at
my first stocking the ground, by

Carry over L. 100 0 0 L. 763 9 4

Brought over L. 100 0 0 L. 763 9 4

trusting me for some years a part of the rent, till the ground is improved, and that he will probably give me a tack of some considerable endurance to encourage me to improve, I shall allow 30 bolls of additional rent, which is

150 0 0

Additional rent

L. 250 00

There still remains

L. 513 9 4

More profit than can be made of the first farm, as at present farms are managed thro' the greatest part of the country.

But this is not all ; for having allowed only two horses, and four oxen, and these last need not be fed with corn as the horses are, three or four bolls will serve them ; so here are four bolls saved of the sixteen allotted for the horses. This however is but a part of the profit had by labouring with oxen ; for you see L. 60 may be made every year by selling two oxen, after they have laboured for two or three years, which cannot be made of horses ; for tho' some may make benefit by bringing up horses, all cannot further them to get service of them while they live ; for all of them must once die in some body's custody. But because oxen are not so good for every service as horses, I recommend a part of each as most convenient and beneficial.

I shall likewise save six or seven bolls of seed, from the following considerations : Let any person observe, and he will scarce find a stalk of any kind of corn, that has not a dozen of grains on it, some not fewer than thirty or forty ; besides several stalks from one root ; from which we may infer, that the product is not less than twenty-four fold ; and yet in common six or seven is thought to be no bad increase ; so that we may believe, a third of the seed sown

sown does not come to perfection. That may be ascribed to two causes; either the roughness of the ground, by which the seed is buried too deep, and is choaked for want of air; or lyes too dry, and does not chip for want of moisture. Now, in malting grain, scarcely one of ten, nay of twenty, but is found sprouted: If the seed sown were as much moistened, it would as universally sprout; and very little grain that is once sprung above ground, does afterwards fail, unless when the season is very intemperate. I therefore recommend steeping the grain twenty-four hours in pure water; then spread it on the barn floor till the water runs from it; and dry it before sowing with powdered lime: And though it lye three or four days, it will not suffer; for it comes as fast on the barn floor, as if it were sown: Before sowing, give the ground a course of harrowing, which will prevent its falling too deep; and then harrow it till it be enough. And by taking this method, and the ground itself being in good heart, three pecks of seed may be sowed on each acre, which on fourty acres is a saving of more than seven bolls. It may be objected, that the steeping of seed seems to contradict the general observation, that a dry seed-time is of all the most seasonable, according to the vulgar proverb, That a boll of March dust is worth a boll of gold: But it is not so much the excess of moisture in the spring, as of cold joined with it, which prevents the seed from springing before it rots: And another bad consequence of a wet seed-time, is, the ground being plowed and harrowed wet, whereby it is kneaded together like leaven, and drying afterwards, it hardneth like a cake, and thereby prevents the air having access to the seed or root of the stalk; besides, the weeds are much encouraged by a cold wet spring, and getting above the corn before it rises, they keep what advantage they get.

[To be continued in some future NUMBER.]

THE
SCOTS FARMER,

AUGUST 1774.

ARTICLE. LX.

*Of the Culture of Turnips.—Of the culture of the Carrot—
Of the Culture of the Parsnip.*

[From DICKSON'S AGRICULTURE, Vol. II.]

Of the Culture of Turnips.

TURNIPS have been long cultivated in England, and in some places are reckoned one of the most valuable crops that the farmer can raise. The trials made in Scotland have been very successful, and there is great encouragement to proceed.

The turnip was cultivated antiently by the Romans. Columella mentions it as a root proper to be cultivated, not only as it filled the bellies of the rustics, but also as it served for food to cattle in the winter season. It requires, he says, a rotten crumbling loose soil; and he recommends that the land intended for it be frequently plowed and well dunged, not only for the sake of the crop of turnip, but also because after a plentiful crop, the land thus managed bears excellent corn. In lands that are well watered, he directs that the seed be sown soon after the summer solstice, but in dry lands not till the end of August or beginning of September. * It is probable, that in lands naturally dry, soon after the solstice, there was not moisture enough to make the turnip seed vegetate, and that it was not till after the eastern winds ceased to
Vol. II. N^o X. P p p blow,

* Col. lib. 11. chap. x.

blow, which was commonly in the end of August, that rain was expected; and that this was the reason why the sowing of the seed upon such land was delayed till that season.

There is very little difference betwixt the culture recommended by Columella, and the culture commonly given to the turnip at this day: And we have no reason to be surpris'd that turnip sown in June upon rich soil well dunged, should rise in that climate to 40 pound weight, as is mentioned by Pliny.†

The goodness of the crop of turnips depends rather more upon the openness of the soil, than its richness. Land newly broke up is particularly proper for them. This kind of land, tho' naturally poor, yet, with the assistance of a little dung, seldom fails to produce a good crop. The land intended for them should be plowed before winter, that it may have the benefit of the frost, and be laid up in such a manner as to be secured against all damage from the winter rain. I have had frequent occasion to observe, that land, when it is laid up in ridges, has a rough surface, is much better exposed to the influence of the frost, and much better secured against rain, than when it is allowed to lye with the smooth surface it has when the crop is taken off; and therefore when land is plowed before winter, it is natural to expect to find it in a better situation in the spring, than if it had remained unplowed. This winter-plowing is not necessary when the land is dry and light. It is early enough to give this kind of land the first plowing in the spring. It may receive a second in the end of May, and a third in the middle or end of June, when the seed is to be sown. Tho' three plowings are here mentioned, yet it is improper to mention any particular number, as the most proper; for the land should be plowed over and over, till thoroughly pulverized.

If

† Plin, Nat. Hist. lib. xviii. chap. xiii.

If dung is to be laid on, this should be done before the last plowing, and it ought to be well rotten; for rough dung gives too great advantage to the drought, which is sometimes very great at the season of sowing.

As the different plowings are at some distance from each other, weeds may probably arise to too great a height before they are plowed in; but when there is any danger of this, they may be destroyed by harrowing.

The ordinary way of sowing turnip is out of the hand, and about half a pound is sufficient for an acre. The seed should be mixed with sand, that so it may be scattered the more equally, the land should be a little rough when the seed is sown, and plenty of seed given. The roughness of the surface occasions the seed to be covered at different depths, and the giving plenty of seed, secures a crop, tho' some of the seed should be buried too deep. Tho' it is the intention in sowing, that the whole surface shall be covered, yet certainly it is better to sow by a drill than by the hand. When the turnips stand in rows, they are more easily hoed, than when sown at random, and there is no danger that the labourers mistake them, and hoe them up instead of weeds, as has been done sometimes. The turnips being easily distinguished by the rows, may be hoed much sooner than ordinary, which is an advantage to them; and besides, the drill may be so constructed as to lay some of the seeds a little deeper than others, which will make some difference in the time of their coming up, and thereby be a means of securing the crop from the fly, by which it is sometimes wholly destroyed.

It is needless to give particular directions about hoeing. This operation should be performed as soon as the plants can be distinguished, and with all imaginable care. As a much greater number of plants commonly come up than should be allowed to stand, the labourer usually puts his
foot

foot upon the strongest plants, and hoes up both weeds and turnips to a considerable distance around.

It is important to begin this operation of hoeing as early as possible, that so all encouragement may be given to the growing of the young plants at first. The turnip is a quick grower, and if it meets with any discouragement at first, becomes sickly, and never can be recovered so as to produce a large root.

Turnips may be cultivated with great success in the new husbandry. They have been tried in single, in double, and in triple rows. It is generally allowed, that they succeed best in single rows, and in alleys from four to six feet wide, according to the situation of the land. The poorer that the land is, or the more difficult to be reduced, the alley ought to be the wider.

After the ridges are formed, the turnip should be drilled upon the crowns; and as soon as they come up, and are past all danger from the fly, they should be horse-hoed, it is of importance to begin this work very soon, for without this it cannot be properly done. The nearer that the plough goes to the rows, it has the greater effect; but this cannot be done if the earth is turned from them on each side: When the plough has gone near, and taken the earth from one side, should it go near on the other, the resistance which the mould board meets with in turning the furrow, pressing the plough in the opposite direction against the small ridge of earth upon which the row of turnips stands, is in danger of turning it into the open furrow on the other side of the row, and thereby destroying the plants. To prevent this, the alleys should be plowed alternately, and after the earth has lain a few days exposed, it should be thrown back again towards the rows, and then the intervening alleys should be plowed in the same manner. This manner of hoeing, allows the plough to go very near the rows without any danger, which is a great advantage to the

the plants, and makes them push their roots quickly at first. But this cannot be done unless the plowing is early begun, for if it is late, the weeds are allowed to come too great a length before the last of the alleys are plowed. It is not necessary to mention, that the rows must be carefully hand-hoed, and the plants taken out when they are growing too thick. Two other hoeings are sufficient: the first from the rows, and the other to them. These hoeings may be at some distance of time from each other, and it is not necessary to go so near the rows as at first.

In preparing land for a crop of turnip to be horse-hoed, there should be as great a depth of loose earth as possible, placed where the rows are to stand. This allows the plants more easily to push their roots downwards, and makes them stronger before they meet with any hard earth to interrupt them. To effect this, let the ridges at the first plowing be formed exactly of the breadth intended for the rows of turnip. When this is done, let the furrows betwixt the ridges be made as deep as it is possible for the plough to go. At the second plowing, let the first be reversed, and the furrows turned into crowns; and at the third, instead of reversing the second, let the crowns be still higher raised. By this means, there will be a considerable depth of earth, where the rows of turnip stand, and their growing greatly encouraged.

It is certain, that a field cultivated in this manner, will carry as large, if not a much larger crop, than when cultivated in the ordinary way. The expence of hoeing by the plough, though done more frequently, is not greater than the expence of hand-hoeing, and the land when horse-hoed is left in a much better situation. The benefit of these plowings given is not confined to the crops of turnips; by them the weeds are more effectually destroyed than by hand-hoeing, and the soil better prepared for the crops that follow. Besides by this culture, the turnips draw more of their
nourish-

nourishment from below the staple of the soil. The better that any plant is nourished, it becomes the stronger, and not only increases in bulk above ground, but also pushes its roots the further below. Now the culture given to turnips by the horse-hoeing, renders them larger and stronger. Hence they push their roots the further down, and draw the greater quantity of food from below the staple of the soil; so that a crop of horse-hoed turnips, of equal weight with a crop raised in the common way, being larger, and having longer roots, do not draw so much of their nourishment from the soil near the surface, and therefore must leave the land in better order.

The only objection to the raising turnips in this way, that deserves to be taken notice of, is this: When the season is unfavourable, it sometimes happens, that the turnips fail on some parts of the rows, which occasions large blanks in the field. But this is in no great danger of happening, when the work is right executed. If the hoe-plough is bad, and the workman unskillful, the earth that falls from the plough to the left side, sometimes buries the plants in the rows; but if the plough is right made, and the plowman attentive, this seldom happens, and if it should in some places, the defect may be in a great measure supplied, by taking some of the plants in the rows where they stand too thick crowded, and transplanting them into the vacancies. For this purpose, the young plants should be taken up when the land is moist, the long root should be cut, so as to leave it about three inches long, and the leaves cut off within an inch of the crown. If these things are attended to in transplanting, scarcely one plant will fail, unless a severe drought follows; and if they are not long in striking root again, the transplanted turnips will be as large as any in the field.

The turnip is proper food either for sheep or black cattle. If the land is dry and needs manure, the sheep are folded

folded upon the turnip. The fold must be removed every day, for it is improper to give them the liberty of more at once than they can consume in that time. When the land is wet or very rich, the turnip may be pulled, and the sheep fed with them upon a field that needs to be manured. By proper care in laying down the turnip, the sheep may be made to dung the field regularly and equally.

When the turnips are designed for black cattle, they must be pulled up and given them, either in stalls or in another field, as found most convenient.

When it is proposed to feed sheep with the turnips on the fields where they grow, it is reckoned most proper to raise them in the ordinary way, and when it is proposed to pull them up and give them to the cattle, either in stalls or in another field, it is reckoned best to raise them in the horse-hoeing husbandry.

Of the Culture of the Carrot.

The carrot is a plant as yet very rarely cultivated in our fields, and indeed it would be to very little purpose to attempt it, if there can be found no other consumpt for the crop, than what the present market affords. A very small addition to the quantity at present brought to market, would entirely satiate it, and reduce the farmers pains and expence to a very small account. But the farmer has a market for these roots at home, and when the corn is high priced, they may be a very great saving to him. Horses have been tried with them, and it is found that they eat them greedily, and are very well fed by them. It is not difficult to raise them; a very small field is sufficient, and the trial may be made by every farmer, at a very small expence.

The manner in which the best crops of carrots are raised in our gardens, naturally points out to us the proper way of raising them in the fields.

The

The best crops of carrots in our gardens, are produced by trenching. When the soil is hard below, though it be well dunged, yet it does not produce a good crop. When ever the roots of the carrots reach the hard soil, they become forked, as the gardners call it, that is, the roots divide ; and whenever this happens, tho' the roots may become large at the crown, yet the crop is never good, as there is nothing below where they begin to fork, that is good for any thing. But deepness of earth is not sufficient, unless the earth below is proper for the nourishment of this plant. This earth below when proper for this purpose, invites as it were the roots of the carrots, to extend themselves into it. Trenching serves both purposes ; it both makes the earth deep, and, by throwing what was on the surface, into the bottom of the trench, lays proper soil below for the roots to extend themselves into ; something like this must be done in our fields, before we can expect a good crop.

Mr Lunin de Chateau vieux, tried to raise a crop of carrots in the manner of horse-hoeing, and was very successful. He sowed them in beds six feet in breadth on the fourth of May. He stirred the alleys with the spade, on the 15th and 27th of July, and a third time on the sixth of September. They were digged up on the 8th of November, measured from 18 to 25 inches in length, and from 2 to 4 inches diameter, and weighed from 25 to 33 ounces. The horse-hoeing husbandry seems to be the most proper for this root, and indeed the only culture that can be supposed to raise a good crop of it in the field ; and as some persons may choose to try to raise it in this manner, a few directions shall be given, which the manner of cultivating them in the garden seems to point out.

Land that has a hard bottom of clay, till, or any such thing, is not proper, and it is vain to suppose, that by the plough, such land can be prepared for them without a
great

great deal of trouble. Such land in a garden may be trenched, and the clay or till thrown up to the surface can be mellowed by dung. By this the soil is rendered proper for a crop of such roots, and ever after fit for being trenched. Though some kind of imitation of this might be done by the plough in the fields, yet the trouble and expence must be such, that no person can be supposed to engage in it, without a stronger assurance of a good crop than can be given. No farmer, therefore, should attempt to raise a crop of carrots upon this kind of soil.

The land upon which any attempt is to be made, must have a soft bottom, and if this is the case, and the land but tolerable, I make no doubt that a good crop of carrots may be raised at a small expence by horse-hoeing.

As the seed must be sown in the month of March *, it is necessary that the land get a plowing before winter. At this time it ought to be laid out in beds or ridges, of the breadth proposed, when the carrots are to be sown, and the furrows betwixt the ridges should be made as deep as is possible, because it is above these furrows, that it is proposed, that the rows of carrots shall be sown. A second plowing in winter should reverse the first, and turn the furrows into crowns, and before the carrots are sown, one bout of the plough may raise the crown of the ridge still higher. Upon these crowns the seed should be sown. As it is not proposed that large fields shall be employed in this way, the seeds may be sown out of the hand into a little trench, drawn as straight as possible, and covered with a rake.

When the weeds first appear, the remaining part of the ridges may be plowed out, turning the earth to the rows

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careful,

* M. de Chateau Vieux sowed the carrots, which he tried in May, but March is certainly the proper season for the climate of Scotland.

careful not to go so near as to cover the plants. When giving directions about the culture of turnips in this manner, it was proposed to plow the whole ridge before sowing the turnip: It is now proposed in the culture of carrots, that before their seed is sown, instead of plowing the whole ridge, the plough should only go once about on the crown. This difference arises from the different seasons of sowing. The turnips are sown in June, the driest season; and therefore every method must be taken to preserve the sap, which is best done by plowing the whole ridge; whereas the carrots are sown in March, in which season there is no want of sap to make the seed vegetate: On the contrary, there is often too much rain, which is hurtful, and the best way to secure the seed from being hurt by it, is to have an open trench on each side of the rows, to receive the water: This is made by the plough going once round on the head of the ridge.

As soon as the plants can be easily distinguished, they should be hand-hoed, and some of them taken away where they stand too thick. After this, if the alleys are regularly hoed in the manner directed in the culture of turnips, I am persuaded the crop will not be bad. The seed being sown where there is a considerable depth of earth, and being well nourished, will quickly push down its root, and the plants being strong and vigorous, when the roots reach the bottom of the furrows, will easily push further through the soil below. When a plant is strong and vigorous, it is natural to suppose, that its roots make their way, and overcome impediments that would effectually resist them if weaker. In the same bed of carrots in our gardens, we observe some of the roots long and straight, others of them short and forked: The occasion of the roots being forked, is well known, to be their meeting with resistance, in pushing themselves downward; and thus, where land is well dunged on the surface, and has a hard

hard bottom, many of this sort are discovered. Now, it seldom happens, that any of the plants meet with such resistance so near the surface as their forking sometimes appears, as all of them meet with, when they have reached below the staple of the soil ; and therefore many of them overcoming this greater resistance, is an evidence that, when strong, they overcome impediments that stop them when weak.

I shall only add, that it is natural to expect, that carrots raised in this manner, will be much freer from worms, and much better every way, than those raised in our gardens, except such as are sown upon newly trenched ground, which has indeed the same advantages, as cultivating them in the manner that has been described.

M. de Chateau Vieux observes, that the carrots he cultivated in this way had a more agreeable flavour, were more tender, more delicate, and took up much less time in boiling, than those cultivated in the ordinary way in the kitchen garden. This he thinks is owing, not only to the making no use of dung, but also to the culture given, by which they enjoy more of the rays of the sun, are better exposed to the air, and receive greater advantages from the dews.

Of the Culture of the Parsnip.

Some persons may be possibly surpris'd to find, that the parsnip has a place here ; and that it should be propos'd to cultivate it in our fields. I know not indeed whether this has as yet been attempted in Scotland ; but I am persuad'd that it may be done with great success, and to very great advantage.

It is said, that in the island of Jersey or Guernsey, they have very extraordinary cow-milk and butter, and that their cows are often fed with this root. It is a certain
thing

thing that it is very nourishing, and that both cows and swine are very fond of it.

The author of the foreign essays informs us, that in Bretagne when fodder is scarce, the cows eat nothing but parsnips, and that, when boiled, cattle eat them with astonishing greediness. *

When properly cultivated, the parsnip grows to a very large size, so that as large a crop of it may be expected as of turnip. Its roots are much stronger than those of the carrot, and pierce much harder earth.

These things should engage some persons to try to raise a crop of parsnips; for if, by the culture of this root, proper food can be provided for milk-cows in the winter season, a very great improvement will be made, as the country will be provided with good milk, which in that season is very much wanted.

The cole, the turnip, the cabbage, and the other things that have been tried for this purpose, have not succeeded; for tho' the cows feed very well upon them, yet they give the milk a disagreeable flavour, and intirely spoil the butter that is made of it. If the parsnips, on the contrary, give the milk and butter an agreeable flavour, as is said, the advantages arising from raising them must be very great.

The form of the root, and the manner of cultivating parsnips in the garden, point out to us that the same culture that succeeds with carrots will succeed also with them. But as the parsnip is a more hardy plant than the carrot, and its roots much stronger, it may be raised with less difficulty.

The author of the foreign essays proposes a method of cultivating parsnips in the fields, communicated by M. le Brigant rector of Plouezoch in Bretagne. It is proposed,
that

* Foreign essays, art. XVIII. p. 146.

that they shall be sown upon land that has been dunged the preceeding year, preferring that which has carried a good crop of barley; that the land shall be deep plowed, and brought into good tilth; that while the plough is at work, the earth at the bottom of the furrow shall be thrown on the plowed land; and that the field shall be divided into ridges 10 or 12 feet wide; that betwixt every ridge a trench shall be dug, and the earth thrown on the ridges on each side. This method is expensive, but, to ballance this, the author promises a crop that shall yield three times as much profit as a crop of wheat, that gives a return of nine for one *; a very encouraging promise indeed, if it could be depended upon.

A trial in the horse-hoeing way will be less expensive, and perhaps as successful. But before any person makes the attempt in either way, he may have a few raised in his garden, to supply a milk cow for a few days. By this trial, he may know if they are as proper as is said, for this purpose; and being satisfied in this, he may then proceed in the attempt to raise them in the fields.

* Foreign essays, art. XVIII. p. 145. 147.

ARTICLE

ARTICLE LXI.

FARMERS KALENDAR.

SEPTEMBER.

Wheat.

IT has been found, by the practice of several counties, as well as from particular trials, that this month is the prime season for wheat-sowing. Sow the summer fallows in the first fortnight and the clover-lays in the second; But let me however observe, that a September sowing is not recommended to be practised at all events: Because if the month proves very dry, it will be proper to stay till rain comes; but September scarcely ever passes without plenty of rain. It is in that respect a surer season, on an average, than October.

In wheat sowing, the first object is the seed: Of this there are so many sorts, that it is very difficult to assert which is the best; but the white wheat, and the red Kentish, are reckoned the finest sorts for producing the whitest flower: But in many of the clay and wet loamy countries in England, the farmers prefer what they call *great* wheat: In some places they term it *clog* wheat, in others *rivets*; but the true name, in common is, I believe, Bearded wheat. It sells generally for about one shilling and sixpence, or two shillings per quarter, less than the other sorts; but, from its hardiness, it more than pays this deficiency in a superior produce.

In respect of preparing the seed, the use of steep is now banished, by common consent; but it is proper to prepare it for other purposes. It is a good way to wash it in fair

water

water several times; because if any of it is smeared with the dust of smooty or burnt wheat, you will thereby waste off such dust, and have, according to the opinions of various persons, the cleaner crop. But a more visible use of washing is, to discover the light chaffy grains; for all that does not sink quick to the bottom should be skimmed away with a quick hand; by which means you are sure of sowing none but the soundest and weightiest grain. Steeping or washing in strong brines, or urine, has one good effect, tho' not a fructifying one, that of preserving many of the grains from being eaten by the worms, grubs, &c. After steeping and washing, it is usual to lay the wheat on a heap, and mix some salt with it, and then dry it with lime. In dry seasons, the salt is of use in attracting moisture to the seed, and thereby making it sprout the readier.

It is a dispute in some parts of the kingdom, whether the wheat-land should be plowed on to the broad, flat lands, or on narrow, round ridges; the first about a perch over, the latter three feet over; on the first the seed harrowed in; and on the second plowed in, in forming the ridge. If land is apt to be very wet, or lies so that the water does not readily run off, the three feet round ridges are much to be preferred; because every furrow is a drain, and, if the water furrows are well cut, not a drop of water can remain on the land; but on drier soils, or those that have been well drained by under ground drains, the flat lands are better, being more equally cropped.

Two bushels are the quantity usually sown on an acre of land; but it has of late been the fashion to recommend a much smaller quantity.

A circumstance of much importance in the culture of wheat, but oftentimes strangely neglected, is water-furrowing: This work should be well and effectually performed on all lands, except those that are perfectly dry all winter through, and such are seldom sown with wheat. The wa-

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ter furrows should be plowed as soon as the field is finished sowing, plowing, &c. and then a spit should be dug out from the bottom of them, and laid on one side opposite to the rise of the land, and the loose moulds shovelled out: The openings of all the furrows should likewise be cleansed, so that the water may have an easy fall out of every furrow into the water ones. The number of these must ever depend on the variations of the surface; the only general rule being to make them so numerous, that no water can stand on the land in the wettest weather. In bottoms of fields, or other places, where there is a double slope of the land, it is necessary to cut double water furrows, about a yard or four feet from each, to take water from each descent.

Wheat is often sown on clover land, and it is the most profitable culture of that grain. In the plowing up the lay, a most excellent practice is, to trench plow it: That is, to let one plough go first, and take off a thin slice, about four inches deep, and then another plough in the same furrow, to get a further depth of about three inches more, raising up the mould, and burying the turf with it: The surface then harrows fine, and the wheat has a bed of mould to lie in, instead of the furrows only of single-plowed clover land.

Another culture of wheat, is to sow it on a bean stubble, which is very good husbandry, if the beans were kept in excellent order; but the land, unless they were drilled and horse-hoed, will require three plowings; and consequently it may be found adviseable to defer the sowing till October: But this month should be made use of for the tillage. Soon after the beans are carted, the land should receive the first plowing, and, before the expiration of the month, the second should be given.

Clover.

The second crop of clover will not, in many soils, be ready to mow before the first week in this month. One
great

great advantage of manuring land richly is to force the growth earlier : the short days and heavy rains, common at this season, are very unfavourable to hay making. As you may very probably find the inconvenience, and have your hay damaged, do not forget the remedy of salting it : Throw a peck of salt in the stacking to every load of damaged hay, and it will recover it well.

Such of the crops of clover as were fed, should now be cleared for wheat sowing : The swine in particular should be turned from the clover into the woods for feeding on acorns and mast. Attention of this sort should always be given, or the profit of a business must suffer.

Sheep.

This is the principal month in the year for stocking yourself with sheep ; and you should therefore consider well the nature of your farm, that you may fix upon that sort, which are most likely to pay the best. The sorts commonly bought are the following :

1. Stock ewes, young.
2. Ewe Lambs,
3. Two or three-year-old wethers.
4. Wether lambs.
5. Old ewes.

As to the breed*, it is a matter of great importance, that you buy an excellent *good* sort, whatever your land ; but the size must be proportioned to the food you have for them. If your soil is poor, light, sandy land, with a very

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spare

* The Breeds are principally these :

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|-----------------|-------------------|
| 1. Teeswater. | 5. Hertfordshire. |
| 2. Lincolnshire | 6. Norfolk. |
| 3. Dorsetshire. | 7. Welsh. |
| 4. Wiltshire. | 8. Moor-sheep. |

spare bite, the *Welsh*, *Moor*, or *Norfolk* sheep will suit best. Such land can only keep a regular flock of stock sheep, but never fat any. You should therefore buy these hardy sorts, and improve the breed by well bred tups, of a small size. But remember in chusing your tups, that no evil is so great on such land, as a tender breed. Upon good soils, that afford plenty of excellent food, you must have recourse to the larger breeds. The Teeswater are the largest sheep in England; but I do not think those very large sheep fit for any but the very richest pastures worth from thirty to forty shillings an acre. The Lincolnshire, though a less breed, must be ranked in the same class. For all middling lands, (for instance, from ten to twenty-five shillings an acre rent), the Hertfordshire, Dorsetshire, or Wiltshire breeds, are preferable to any of the rest: These are all well made sheep, and will rise, with good management, to a very great value.

The first sort of sheep in the above table, viz. young stock ewes, are proper for these persons, who design to keep a regular flock, for the three articles of profit, lamb, wool, and folding. A farmer, when he purchases stock of this sort, should consider well his land, and take care to proportion the number, as well as he can, to the food he shall have for them. This is a very profitable application of inferior pastures, of clover, ray-grass, burnet, and common sheep walks; also of using any right of commonage annexed to his farm; and he must also appropriate a certain quantity of turnips or cabbages for the winter maintainance of such flock. Upon an average of crops, he ought to have 10 acres to every 100 sheep, and a piece of burnet, or ray-grass to take them in the spring. The folding business should never stop with a flock of this sort: In the depth of winter, it should be carried on, either on dry gravelly pastures, or under cover, on plenty of litter. Perhaps the profit of these sheep supposing the
ewes

In this management, it is a matter of great importance to have the ewes lamb early, so that the lambs may be fat, and ready to sell the beginning of May at farthest. If care is taken to have plenty of turnips, cabbages and early grafs, the profit on a good breed may be carried higher than this account. Fat grafs lambs are often sold the beginning of May at 19 and 20 shillings a piece, of the best Hertfordshire breed.

The second sort of sheep, viz. ewe lambs a year old, are in some places bought in, at this time of the year, to sell fat by that time twelvemonth, after the lambs (fat) have been drawn by the butcher. This is but an indifferent conduct, much inferior to several other plans.

The purchasing wethers of two or three years old, is a very profitable management. A good method is to buy them at this time, to keep them bare through the winter, only baited at turnips or cabbages; however, in good order enough to fold constantly on the dry grafs lands: To continue them on but indifferent food, folding till July; then to throw them into good grafs, and from thence to turnips; from turnips to cabbages, and not to sell till *April* and *May*, when mutton is dearer than at any other time of the year. This account may be stated thus:

The wether fat	-	-	-	-	L. 1	7	0
Wool	-	-	-	-	0	5	0
Folding	-	-	-	-	0	1	6
					L. 1	13	6
Prime cost	-	-	-	-	0	16	0
Profit	-	-	-	-	0	17	6

In this method, near the first year is passed for the folding, by which means you have a full folding stock all the

the year round ; and it is observeable that the profit of that manuring, through I attempt partly to calculate it by way of proportioning the sorts of sheep, yet is it much more considerable than mentioned in any ; and, in a long course of years, beyond all calculation. This flock of wether sheep is very advantageous in one respect, which is their hardiness, and their being little liable to accidents, not near so troublesome in attendance in winter as ewes.

Wether lambs, a year old, are in some places the stock bought in at this time, and sold fat in a twelve month from grass, which is a profitable management.

Lastly, comes the stock of old ewes ; but this article must be explained. In the stock flocks that are never fattened, a varying number of the oldest ewes, are every year drawn out, sold, and the same number of lambs kept in their stead. The rule of drawing the old ones, is the state of their mouths. When their teeth fails, so that they cannot fare well on the sheep walks, nor stand the fold, they pick them out, and, driving them to fairs at this time of the year, sell them to the farmers who do not fold, and who buy to fat within the year on richer grounds : This is a very profitable management. The breeds are seldom good, as they come generally off of poor sheep-walks : So the price is proportioned from five to ten shillings, about seven shillings and sixpence an average : They are kept hard till they lamb, then are helped with some turnips, and well kept till the lambs are drawn off fat, after which the ewes fatten, and all are gone within thirteen months. The couples sell in proportion to the first cost ; but if you have pretty good luck, you will treble it. If they cost six pounds a score, they will fetch eighteen pounds ; This sheep management is as profitable as any a farmer can fix on.

Fatting beasts.

You must now be very attentive to the state of your fatting beasts, and the remainder of your grafs. It is no uncommon thing to have food fall short in this month : see therefore that your cattle do not stop for want. A beast that is nearly fat must have plenty ; because he is nice, and if he is at all curtailed in his pasture, will fall away. The middle of this month, there should be a large breadth of mown ground untouched, ready to turn into ; and some should be quite fresh for them the very end of this month, to take the beast, and carry him pretty far into October.

Remember that beef is cheaper at Michaelmas, than at any time throughout the year ; for all grafs-fed cattle are then at once brought to market : this should give the attentive grazier an idea of varying, as much as possible, from the common method : to sell only a part of his cattle at this time, only such as are so fat, that they would be unprofitable to keep longer, and to put the rest, when all the grafs is done, to turnips or cabbages.

Cows.

The dairy of cows must have plenty of grafs throughout this month, or their milk will be more apt to fail than at any other season of the year. Lucerne, mown green, and given them in a yard, is the most profitable way of feeding : the product is so singular, and so little dependant on the seasons, that it is a very matter to proportion the dairy to the plantation of it, and never be under a want of food ; for lucerne, mown every day regularly, will carry them at least to the third week in October ; and, although some persons have asserted, that cows will not give so much milk thus managed, as when they range at large, and feed how and where they will, yet it is not a matter of enquiry ; be-
cause,

cause, if they give but half as much, that half will assuredly pay more clear profit, than all in the other case: there may be some inferiority; but the cows are kept on so trifling a quantity of land, that there remains not any comparison between the methods, for profit.

The Teams.

These must be kept at work close, or let the farmer remember he loses money by them. Wheat-sowing is one of those works, in which we usually stretch a point, and make the ploughs do a quarter of an acre each extraordinary. Both horses and oxen should be kept this month to lucerne, mown every day: they will work as well on it as any other food; but, while they plow, they must now have oats and chaff with it: for no grass, at this season of the year, is so nourishing as it was in the summer.

Manure Grass.

Grass lands should be always manured with composts, and never with dung alone, for many reasons: dung should never be kept until it is so rotten, that it will wash into turf; because by that time, it loses its virtue at a great rate, and, while in full fermentation, it is of such great utility to arable land, that a greater profit will so arise from it, than by laying it on to grass. Besides, there are many succedaneums for dung, or at least, for making it go much further on grass, than on arable: The proper composts are chalk, clay, turf, ditch-earth, pond mud, lime, ashes, foot, with some dung; all, or some of these mixed together twice in a twelvemonth, will be in excellent order for spreading on grass lands, and will be highly sufficient to keep them in great heart, with but a small quantity of dung. This is the proper season for carrying such composts on: lay about 15 or 20 loads an acre, not more. It is difficult to

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over-manure arable lands, but very easily done with grass; because large quantities do not wash in quick enough. Let the compost heaps be spread very regularly, which is much more necessary than on arable. A good farmer will manage to give his pastures, unless they are very rich, a dressing of compost every two years.

Scarify Grass Lands.

Scarifying grass is a new practice of some ingenious gentlemen, but not yet become common husbandry. It consists in cutting the turf with a plough, of nothing but coulter, or with a plowing harrow: so that the surface may all be cut or torn; this operation is on principles directly contrary to the common idea of rolling in Autumn, which is done with design, not only of levelling for the scythe, but also of pressing the surface as much as possible, for which the heaviest rollers are chosen, until some are worked, that require six or eight cattle to draw.

If there is any fault in the nature of turf, which prevents the ground yielding crops proportioned to its fertility, it is the surface being so bound by the net-work of roots, which are matted through it, to the exclusion almost of the influences of the atmosphere. Now rolling increases this evil; the more you compress the soil, the less pasture will the roots have: But scarify it, tear it well in pieces, you in fact horse-hoe your grass, and give the roots loose earth to shoot into; but if your design is to manure, this argument is yet stronger; for after the surface is scarified, the compost being spread, much of it will at once fall into the furrows of the teeth or coulters, and consequently be immediately deposited, where you would wish, at the roots of the grass. Every one knows in general, the trouble and difficulty of getting manure into grass land; how many times you must harrow, brush-harrow and roll, before it dis-

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appears, and at last the effect is very partial; for but a small quantity gets to the roots. Half this labour, after scarifying, would do it far better.

But here let it be observed, that there is an effect of rolling so visible, that it cannot be disputed, which is, the bringing a finer blade of grass, and giving a better winter verdure, partly owing, however, to the levelling the worm-casts, which being of a different colour, their disappearing, of course, makes the green still greener: for lawns, in sight of a house, therefore, the more you roll the better; but not for a great product of hay.

Fern.

Now is the proper time to cut fern, called in some places, brakes and brakens. This is most profitable work, and should never be neglected. Carry it into your farm-yard, and build large stalks of it for cutting down through the winter, as fast as the cattle will tread it into dung; also for littering the stables, ox-houses, cow-houses, hog-ties, fattening-sheds, &c. &c. By having great plenty of it, you will be able to raise immense quantities of dung, which is the foundation of all good husbandry; and it is well known, that no vegetable yields such a quantity of salts as fern; from which we are to conclude, that it is best adapted to the making manure. The good farmer, in this work of bringing fern, should not confine himself to his own wastes, of which he may have none; but purchase it of his neighbours, if they are within a tolerable distance. It will answer exceedingly well: He need not therefore fear paying for it, as for refuse straw.

Stubble.

This month is the proper time for chopping the wheat and rye-stubbles, and raking into heaps, for carting home to the farm-yard for litter, upon the same principles, as

fern is carted there. This is a business strangely neglected in most parts of the kingdom; but is nevertheless of very great importance: The stubble left on the land is of no advantage as a manure; but it prevents the plough from turning in the land with any tolerable neatness, and if the quantity is considerable, it will be such an obstruction, that no plough can perform its office at all; but carted into the farm-yard, it becomes an excellent manure. Any sort of litter there is valuable, and serves for the cattle treading into dung. In those parts of the kingdom, where this use of stubble is common, the price for chopping and raking into heaps, is from one shilling and fourpence to one shilling and eight pence per acre: a very small expence, compared with the great advantages that undoubtedly result from it.

Plough Fallows.

Now let your ploughs turn up all sorts of stubbles: This is one of the material parts of husbandry, in which the common farmers are greatly wanting: They form very mistaken ideas of this part of husbandry, suffering their lands designed for fallows, and some even for spring crops, to remain till after barley sowing, before they break them up. The principal reason they give for this conduct is, the benefit of feeding them with sheep. As to the point of the land being better or worse for its exposure to the atmosphere during the winter, it comes not at all into their enquiry; for they comprehend nothing of the matter. But let the attentive husbandman, who does not give up all his ideas of common sense, in compliance with the old customs of his brethren, consider a little before he leaves his fallows till the spring before plowing. He must be sensible, that the air at all seasons, especially in frosty weather, pulverizes the clods. In the middle of summer, when the land is hard baked, such an effect may be doubted; but if you stay till

rain

rain comes, and succeeding various weather, the fact will be sufficiently clear. Now the farmer should consider, that pulverization of his land in winter is alone a matter of consequence; because it is a sure method of making the weeds grow; and let them ever remember, that they cannot kill weeds, if they do not grow. If the fallows are plowed up in this month, and left well water-furrowed till March or April, they will by that time be covered with weeds: The first spring plowing destroys all these. Can any one think it a matter of little consequence to effect this? Every seed that vegetated in consequence of the autumnal plowing, would have remained safe locked up in the land, until the spring plowing, and then if any crop is sown, it is sure to be full of those weeds, which an autumnal plowing would have raised, and the seed-earth destroyed. To kill weeds, they must be made to grow, and, when once they are above ground, a plowing destroys them: So that, if a farmer breaks up his stubbles in this month, and sows on one spring earth, he kills all weeds that have sprouted, at the same time, that he plows for the crop; all which weeds would have grown up with his crop, had he sowed it only on the plowing.

With the fields designed for fallows, the case is pretty nearly the same; plowing at this time of the year has the effect of making the seeds of weeds vegetate: so that such of them as survive the winter, are destroyed by the first spring plowing; this gives the farmer an opportunity of harrowing after that earth, and leaving the land for six weeks for another crop to come up, which, like the former, is destroyed by the next plowing: Thus the autumnal tillage is absolutely requisite, for the mere work of killing weeds, without recurring to the attraction of any beneficial particles from the air.

The latter effect may appear very equivocal to a common farmer, never used to consider things deeper than first appearances.

appearances. Unhappily this is a part of husbandry on which we can only speak from idea, and not in the least from experiment. Of all the volumes that have been published on husbandry, none gives one a clear proof of the acquisition of manure from the atmosphere: the benefit of fallowing is no clear proof; because it is never experienced exclusively of killing weeds, and, unless such effects were known distinctly, one cannot, with any precision, attribute a certain degree to each. As experiment has not, and probably will not, prove this important point, it remains for the disquisition of reason alone, which may adopt whatever ideas appear most just to individuals. There are many arguments to be produced, to shew, that the great benefit of fallowing, at whatever season, is the destruction of weeds, and mere pulverization, without any reference to supposed acquisitions from the air: a strong one is the equality of crops, that succeed complete fallows, and other crops: the latter, if sufficient care has been taken to destroy the weeds, are generally as good as such as follow complete summer fallows. Wheat, for instance, after beans well hand-hoed is as good: after pease, if a great crop, the same without any hand-hoeing at all; after clover also, in which the land is bound, and matted together with roots: And the great fertility of new broken-up grass lands, should look, as if the very contrary state to fallowed lands was most beneficial. Many writers talk of the great benefit of thick shade, and the putrid fermentation of thick and luxuriant crops. It may all be very true; but surely the whole is founded on principles extremely different from the acquisition of aerial benefit by fallowing! I know of none in which they agree, but the killing weeds.

The acquisition of nitre, say some, is well known to be greatly effected by land being plowed on to the ridge in winter: and nitre, say others, is the principle of vegetation. This fact, of nitre being so very beneficial, seems rather to be a deduction of reason, than an experimental proof

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proof. Salt-petre, in every application, has often been proved rather poisonous than beneficial. Why, therefore, should we suppose it of such consequence in the air? I am by no means asserting the contrary, but only expressing doubts of those maxims, which do not seem to have had experiment for their foundation. Let us, for these various reasons, be contented with recommending autumnal plowing to the husbandman, on principles that he can understand, and effects which are visible to him, pulverization, and the killing of weeds: And not persuade them to the practice; for reasons, which are *Greek* and *Hebrew* to them.

Water-furrowing.

See this article in our First Volume, page 161

Lucern.

Your drilled or transplanted lucern will yield another cutting probably this month; but, at furthest, the first week in October; after which cutting the succeeding short growth is no object; but if it is cut the beginning or middle of this month, the case is different, for you will have another the end of October. But, when ever you take the last, make it a rule to manure the whole plantation from the compost dunghill; chalk, marl, turf, rotten dung, ashes, foot, lime, malt dust, &c. &c. will make a very rich mixture for it, and as it is done every year a small quantity at a time will be preferable: For instance, twelve large loads an acre. As soon as the manure is spread equally over the ground, send in the common ploughs; and if the lucern is drilled in single rows, go about in each interval, opening the land in the middle of it, and throwing a ridge over each row; by which operation the whole field will look like a fallow one, in ridges under which are the rows. And it has this great advantage, that all the
manure

manure is gathered exactly up, and deposited on the plants, being at the same time covered in from the weather, and each furrow is a drain ; so that, if the water-furrows in the field are well opened, not a drop of water can any where lodge. The first dry weather after February in the spring, the ridges must be several times harrowed across, enough to level the whole field, and so left for the young shoots to come through.

Let the cultivator of lucern remember, that one acre, managed in this complete manner will pay him better than many conducted in the method but too common. It may appear a species of extravagance to manure a crop every year ; but lucern requires much manure : It will on good land, yield very beneficial crops without any ; but to be carried to the highest perfection, not only of *product*, but also of *clear profit*, it must have great plenty of rich manure. Lucern has been carried to a product of above forty pounds per acre *per annum* ; but it was by being planted in a piece of ground as rich as a dung-hill.

ARTICLE LXI.

On the Culture of Coleseed ; By ARTHUR YOUNG Esq;

[*Continued from our last p. 460.*]

ADDITIONAL REMARKS.

COLESEED, is one of the most profitable common crops known in England ; it may be therefore thought somewhat extraordinary that a premium should be adjudged to a paper proving it good for nothing. These circumstances, apparently jarring ones, requires a word or two in explanation.

The

The Society did not demand *in general* an account of the most profitable culture of the coleseed, but expressly tied down the candidates, by adding the condition, *for feeding cattle and sheep*. Thus was the culture of coleseed in general, and the specified application, two things, absolutely different.

Coleseed, I have said, is a most profitable crop.——It is so: but not for feeding cattle; nor should I have conceived that any persons could have thought of comparing it with turnips in that light. The profit of the crop is the seed—which amounts to five times the value of any food for cattle that will ever be gained from it.

I have made enquiries in many parts of the kingdom concerning the culture; and I find, that the great object is every where the seed; that in most parts they have no idea of feeding it at all; and that in others where it is practised, they do it merely upon the same principle that wheat crops are fed off; the farmers are distressed for green food, and they turn their flocks into their wheat and coleseed, (in many places absolutely against their own judgment relative to the crop alone) not because such crops were sown for the purpose, but their yielding food when the flock starves.

Some very sensible farmers, long practised in the culture of coleseed, with whom I have conversed on the subject, have assured me, that if it is fed when the food is wanted, that is after turnips are done, the crop of seed is vastly damaged by it; to a much greater amount than the value of the sheep fed.

Some of them have told me, that they have fed off crops earlier, and they think the seed not the worse. But this they mentioned as a doubt.

But if the plant be applied to the same use as turnips, and used at the same time, it is agreed throughout the kingdom that the culture is worthless, not producing near the
quantity

quantity of food with that crop ; nor paying in any respect so well.

Respecting the culture of coleseed merely for food in April and May ; that is, to succeed turnips, there is one strong reason against it, which is its not producing a great weight of food per acre ; I know both from my own and others experience, that the weight of food is trivial, compared to that of turnips and cabbages, &c. I will venture to say, not an eighth part. Consequently much land must be appropriated to this use, and after the season in question, what crops of barley or oats will be gained ? The sowing will be in May ; now it matters nothing to enquire into culture or any other circumstances ; it is clear enough that the Spring corn-crop is ruined by late sowing. Hence arises the necessity of the Spring food yielding a great quantity on a small space of land, that the farmer may experience this evil only in a small degree ; cabbages, which yield as much food on one acre, as ever coleseed will on six, appear to come infinitely nearer the wished for mark.

The importance of gaining a Spring food to succeed turnips is very great, and the kingdom is much indebted to the Society for giving this object their attention ; but whatever may be the result, the point of a late sowing of the Spring corn-crop should never be forgotten ; for if all or much of the barley and oat crops are sown so late, vastly more will be lost in one crop, than gained in the other. If therefore the food is an arable crop, it must be one that yields a great quantity per acre ; and the best management in that case would be, to occupy a certain number of acres proportioned to the flock of sheep every year ; with the same plant. Suppose cabbages : one crop will be off just in time for getting the land ready to receive the plants of another.

Where buck-wheat is known, a late sowing is no objection ; but the plant is too confined an object to reason upon.

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Thus much on the distinction between the culture of coleseed *in general*, and the application of it to feeding cattle *in particular*. They are different matters, which should never be substituted, the one for the other — Another point to be mentioned here is, the offering *unsuccessful* trials to the Society.

It may perhaps be said, that premiums are offered for *improvements*, and not for accounts of bad husbandry. But I beg leave to differ from this opinion. If premiums are offered for the culture of vegetables not universally profitable, surely there is as much utility in saying, *where the culture is pernicious*; as, *where it is beneficial*? We may be allowed to suppose, that so intelligent a Society would not offer premiums for a matter that *cannot* answer on any soil. But granting the specified culture may answer on certain soils, is it not of use for every man to declare whether it is good or bad on his land? Is there not great utility in knowing, that coleseed for instance will not do on wet loams? Other people farming such soils are thereby kept from useless expences. It appears just as useful to say experimentally, that turnips will not do on my loams, as to assert that wheat will not do on my gravels. There cannot be a more futile idea than measuring the merit of experiments by their success. — The Society annually offer gold medals for accounts of horse-hoed barley and oats — Will those medals never be adjudged *until* successful experiments are sent?

ARTICLE LXIII.

EVERY MAN his own VERMIN-KILLER;

Containing, The most effectual methods of destroying that mischievous little animal the Rat; as also the Mouse—Mole—Ant—Dore, or Black-clock—Worms—Snails—Grasshopper—Crows—Weasel—Polecat—Stoat, and Fox.

By a Farmer, who made it his study for many Years.

MANKIND in general may think it extremely odd, for a man to sit himself down to write on so trifling a subject as VERMIN; but when considered by those who feel the bad effects of not destroying them, I flatter myself they will not think my time altogether thrown away.

We have had numberless treatises on this subject, most of which I have read, and followed their directions, but cannot say with such success as I could have wished.

In a late publication the author says, "I shall lay down a concise method to destroy all kinds of Vermin." The public, in my humble opinion, might as well read for their instruction the history of animals; for he has not given any method of destroying one half of what he has undertaken: Therefore, lest I should be thought guilty of the same error for the sake of swelling the publication. I will endeavour to avoid those vermin, which neither myself nor any other person could ever find a certain method of destroying.

The method that the nobility, gentlemen, farmers, &c. make use of, is, to send for a man, known in the country by the name of a Rat-catcher, to whom they pay a stipulated price for every Rat. The Rat-catcher by this method picks up a good living; for when not employed, his leisure hours are taken up in catching Rats, or purchasing them alive, which he keeps by him till sent for again, and

the morning after he has set his traps, he carries the live Rats with him in a bag, and imposes upon his employer a certain number, perhaps not one of them taken in the traps the night before : therefore I would recommend to those who employ these people, to see the head of every Rat cut off, else he may be assured of paying for one set of Rats brought to his house half a dozen of times. I have known the famous Gipsy Rat-catcher walk fifteen miles, after setting his traps in the night, to a man who used always to keep live Rats by him to harden his Ferrets, and borrow half a dozen of him for a week ; nay, I have been told by his friend the Ferret-man, that he has known him put live Rats into the out-houses of gentlemen (whom he knew would employ him) to breed, so that as soon as the first Rat was discovered, he was immediately sent for, and as soon caught them, without reducing the number ; nay perhaps he increased them ; for his going to and fro gave him an opportunity of conveying more into the building heavy with young. There are so many tricks made use of by Rat-catchers, that it is almost a thing impossible to guard against them.

Some Rat-catchers have a method of stabbing Rats in thatch of barns, &c. at random with a long spear ; if the thatch be old, it shakes down and the water lodges ; if new, it leaves it so light that the rain forces its way through, and rots the under-work, therefore of bad consequence. The only certain method is, to ~~fix~~ upon a board the trap hereafter mentioned, as near to the holes at the bottom of the thatch as possible, when the Rats may be as easily taken as upon the ground.

Of Rats.

We have in this island four sorts ; the Barn, Field, Water, and the House-Rat.

The Barn-Rat is grey upon the back, and called by some the Norway, by others the Hanover ; it is no matter from
whence

whence they came; we are clearly convinced, to our sorrow, that every part of the isle is pestered with them. This Rat will not only frequent barns, but ricks, sewers, hen-houses, hog-sties, under floors in houses, behind wainscots and cielings.

Of Field Rats.

They are of a brown grey cast, about as large again as Mice; you will find them from October till May, by the shape of their holes, in the corn-fields, which is made round as if cut with an auger: When the farmer sows his wheat, especially upon one plowing, they will run from one end of the furrow to the other, and eat or carry away the greatest part of the grain: They will likewise run along the drills of peas. You will often find in the hedge row adjoining the field where peas are sown, a large quantity growing, as if the man who had the drilling of them had thrown them away, which is the place they lay up their store in. I have known them carry peas the width of ten acres in an open field, which is near 160—, as if not able to carry them as far as the hedge, and what they left of these have grown as thick as possible for the circumference of three yards. It will be dangerous to leave traps in open fields, therefore in the canicular days, when the fields are commonly bare, put into their holes a few hemlock seeds, or mix up a little flower with honey, and a little ox-vomit till it comes to a paste, which put into the holes, and it will immediately destroy all the Rats in the Field.

Of Water Rats.

They frequent rivers, banks, &c. I have known them burrow in banks like Rabbits, and to make good their flight, they always have an entrance to their houses from land and water: They live upon vegetables, and are fond of young

young peas and clover ; they may be taken with the same cage and bait as other Rats ; only remember that the cage will not swim upon the surface, therefore it must be buoyed up with pieces of cork or wood, so that the holes may be within half an inch of the water. You may drive four sticks into the water, and place the cage upon them, but be sure to take care it stands firm : The shortest method would be, if you have not any poultry near the place, to mix up with the bait for other Rats a little Ox-vomit, which will destroy them as soon as they eat it.

Of House Rats.

These Rats are black, and frequent the cieling and wainscots of houses ; in out-houses you will find them under the ridge tiles, behind the rafters, &c. The place they frequent you will easily find by the blackness of the rafters they run upon ; nay you may smell them : the cage and bait, hereafter mentioned, will soon take them ; only observe to place the cage upon the rafter, &c. where they run : If too narrow, you must fix a board even with the rafter, to set the cage upon.

The method of destroying Rats.

Some make use of steel traps, others of wood traps, called Hutches, in which you are never certain of catching above one Rat at the same time, unless they should happen to come in droves, and fight which shall get into the trap first ; and for this reason, the Rat which touches the bridge, causes the trap to fall at both ends, and shuts his companions out ; besides, to this trap there hangs a great expence, for you must have a small wire cage, to take the Rat from the hutch, if by chance you take two, which is five hundred to one against you ; then you must have a larger wire cage to put the taken Rat into, or carry a pail of water with you

to drown him, which is not only tedious, but it keeps you too long in the place; which ought to be kept as private as possible; for Rats are as fly as Foxes, and ought to be dealt with in a very gentle manner. The steel trap is so exposed, that if you take a Rat, his cries will make the rest so shy, that you will never catch another in the same place: besides the common method of setting a steel trap, is to bait it with cheese, bacon, &c. then place it upon the ground where the Rats come. As I before mentioned that Rats are very fly, the trap should be disguised with a little moss, or something of that kind, which is at hand, and nothing exposed but the bait, or if that was covered it would be as well, for they can with ease smell it. Therefore, to be at a greater certainty, and save both expence and trouble, I recommend the following cage, which will answer three purposes, and hold a dozen or more at a time:

Let the wire-maker make a wire cage,
One Yard in length,
Eight inches high,
and Eleven inches wide,

with a * Fall at each end, and one on each side; the side falls must be made so as not to interfere with the ends, nor opposite each other. When the cage is compleat, let the carpenter make a very thin deal box, as a case for the cage, so near the exact bigness of it, that it may be taken in and out with difficulty, and against the falls of the wire cage, cut holes in the box; this method may appear odd to many,

* N. B. By a *Fall* is meant a wire door, hung at the top instead of the side, and the lower part of this door or *Fall*, should have the wires extended a little in length, and pointed, which will prevent the rat from lifting it up with his nose, so as to get out of the cage again.

ay, but a second Rat will never enter a trap or cage, if he sees another confined. A night or two before you intend catching, take the box only, bait it in the manner following, when you find they have eat the bait, put the wire cage into the box; be sure you clean the box, least any thing should obstruct the wire cage from going to the bottom of the box; then put a little of the bait into the cage. I would recommend a lock and key to the box, (for when traps are set, it most commonly excites people to be continually looking at them) for which you must have staples and a padlock, as an inside lock will prevent the wire-cage from filling the box in a proper manner; never wash the inside of the box; if the dung sticks to prevent the wire cage going down properly, scrape it with a knife; when you take any Rats drown them in the wire-cage, and when it is dry put it into the box again.

Some may be provided with traps, and may not choose to purchase this wire-cage, which however is by much the best! They may bait them with the following paste, and remember that whatever sort of trap is made use of, should be placed as secret as possible; round the trap shake straw or fern, that the Rats may come in private; if you find any holes in Barns, &c. that go through into orchards, fields, &c. then take a red herring, tie a string to the tail and draw it round the building, then through the hole to the place where the cage stands, and the Rats will run at it like a dog footing a hare; if you have any trap but the wire one, bait it with the herring as well as the paste.

Receipt for the Bait.

Take three large spoonfuls of flower,
 Three spoonfuls of grated white bread,
 One spoonful of treacle,
 Three drops of oil of carraways,
 Three drops of oil of anniseed,
 Six drops of oil of red herring,
 And mix them well together.

It will be proper to put this mixture into a bason or pan, for paper will draw the virtue of the oils away.

When your cage or trap is set, it will be necessary to scent it with the following oils ; for which purpose take a phial and put therein,

Half an ounce of oil of anniseed,
 Half an ounce of oil of rhodium,
 Half an ounce of oil of carraways,
 To which add two grains of musk.

Then take a feather and rub round the hole of the trap or cage ; when done put the feather into the inside of the cage. This receipt will take all Rats excepting the Field-Rats, for which you have had a remedy given. Please to observe, that in whatever place you set your trap, to bait it likewise with the food you find the Rats destroy, such as oats, wheat, barley, malt, guts, &c.

Of Mice.

We have five different sorts ; two of which differ only in colour, the Grass-Mouse, and the Black shrew-Mouse, which are very harmless, and live upon vegetables.

The House Mouse

Is known by every one to be of a very devouring and nasty nature ; the shortest remedy to destroy this vermin, is, to mix with the feed prescribed for rats, hemlock seed beat as fine as possible, which set for them at night in a plate or flat pan, which you may take away in the morning ; be sure you move all eatables from the place where you set the feed ; this method will immediately destroy all that feed upon it. Numbers there are who do not approve of any poisonous mixture for fear of accidents ; then you may take them alive with a cage made after the same manner as the rat-cage, only

nine

nine inches long,
four ditto wide,
and three ditto high,

with a fall at each end, with a box as before described for rats, if in barns the rat cage will take them; the cage for mice must be set with as much care as for rats, which when done, if it can be avoided, let no one go into the place after you have set it.

The scenting oils may be used as mentioned for rats.

The Field-Mouse

Is something larger than the house-mouse, with a red back; he will feed upon corn or flesh, and is very pernicious to farmers and gardens; he will run along the drills of pease, and under the furrows of wheat land, sowed upon one plowing, and destroy the greatest part of the seed; in severe weather he will, if possible, get into houses, and destroy every thing in his way.

The cage will take him, as before-mentioned for the house-mouse. When you find holes, as if cut with an auger, in the gardens, mix up a little flower and honey with Ox-vomit, which put into the holes as low as possible, for fear any poultry should get to it, and when the fields are cleared of the corn, in the canicular days, then do the same, and it will immediately destroy all Mice that feed upon it, or the rat-food with hemlock, or ox-vomit, will answer the same purpose.

The Mole.

This vermin is known too well to every inhabitant of this island, therefore it is needless to give a description of it. The common method of taking the mole is with traps, but few know how to set them. The certain method is to find the angle where the mole runs, which press down with your

feet, and if in the morning you find the earth raised up again, there set your trap, and you will be certain to take him; when you have set the trap, be sure you cover it and the hole which you broke up, well over, that no light may get into the angle, for the mole will certainly avoid the trap if it sees the light. Numbers there are who imagine that a mole cannot see, which is a mistaken notion, the eyes of the mole you will find upon the sides of the head, about the size of the point of a large pin, appearing like a small black speck: To prove what I have here said, whenever you find a sheep (which is often the case) to have trod in the angle, you may observe, when the Mole comes next to run the angle, he will retire from the hole the sheep made, and immediately turn the angle another way: Some will set a trap twice in a place, which is a wrong method, for the Mole, if possible, will avoid the place where another was killed. The Mole will heave the earth three times in the space of twenty four hours, some people then make use of a spear.

I would advise the keeping of the Moles taken, for two or three days, till you think you have taken the greatest part in the inclosed field; then cut them in three pieces, and put them into the angles as nigh the edge as possible, i. e. open the earth as if you was going to set a trap, and no more will enter the field while any smell remains in the dead pieces. It would be an endless piece of work for a farmer to take moles by traps upon his outside land in common fields, unless his neighbours would join with him; therefore the only method he can take, is wherever he finds an angle or hill, to clear the earth until he comes to the hole in which the mole runs, and put therein a piece of garlick, onion or leek, the smell of which will cause the mole to quit the earth as if amazed by some sudden shock, when, if you watch the land, you may with great ease kill him. When
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the farmer sows his seed, before he harrows it in, sow at each end of the acre, and the width of two furrows on each side, the seed of Palma Christi, as thin as possible, and no Mole will enter the ground on which it grows : If the water should lie in the furrows, as is often the case, and sometimes upon three or four yards from the water furrow, then sow the seed at your discretion where you are certain it will grow.

The Mole breeds in the month of April, at which time farmers and gardeners ought to be very attentive, for by finding out where they breed, they may not only take the young but the old ones, which may be done in this manner : the hill thrown up will be as big as a bushel, take a spade and dig round the hill a trench below the depth of the angle, stop the holes of the angles on the outside of the trench, to prevent the Mole running ; then dig him out with a spade ; be careful when you dig the trench to shake the earth as little as possible.

Ants or Pismires

Commonly assemble in mole-hills ; they will destroy barley, rye, hemp-seed, lintseed, and rape-seed ; other grain is either too large, double-skinned, or too bitter : When you find them in quantities near home, pour hot water upon them. The farmer when he dungs his land, if he uses ashes, lime, or salt sand, he may be certain no Ant will ever stay upon the ground where any of the three is spread.

Dores or Black-clocks

Will destroy corn before it shoots, after which it will leave it. They do the farmer double injury, for they are not satisfied with destroying the grain, but will pick out the fullest and best corn. The burning of couch, or any other weed that will cause a smoak upon the land, will drive them away ; or if you sow sharp lime with the grain, the smell will

will affect them, that if they eat the grain that has touched the lime, it will immediately destroy them.

Worms

Are the next destroyer of all kinds of grain; for they take it when the Dore or Black-clock quits it, which is at the sprouting, when the ground hath rotted it, and the milky substance is breaking open the upper husk, it shooteth forth in little white threads at both ends; then the Worm feedeth extremely, and so by devouring the substance, it prevents its growing out of the earth. Worms may be called the citizens within the earth; they are innumerable; and the loss sustained by them is infinite.

Before the farmer sows his corn, let him take some hemp, boil it in water, and after it has stood for four hours, sprinkle the grain before he sows it, and no Worm will touch it. The smoak of ox-dung mixt with straw, and burnt upon the lands, will destroy all the Worms within the depth of the plough: please to observe, that all fires made upon the land should be lighted in the evening, when clouds bid fair for rain, then the smoak will fall upon the earth.

Snails

Will devour the grain, like the Worms, in the milk, feeding upon the tender white threads which shoot from the seed, and would rise above the earth, being the stalk on which the ears should grow, were it not devoured by the Snail as soon as it breaks through the earth, for they suck the tender sweetness, and deprive it both of nourishment and life. About three weeks after you have sowed your grain, I mean that which lieth long in the ground, such as wheat, &c. sow foot as thin as possible, and no Snail will come nigh it. In France they sprinkle the lees of common oil over the land, which prevents all such vermin coming nigh it.

Grasshoppers.

Grafshoppers.

Some parts of England are much pestered with them : They, like the Snails, destroy the grain after it is sprouted. Some people have a notion they do no harm, but if the farmer will examine his corn, he may soon be convinced to the contrary ; for where they have fed, the ears of the corn will be withered and lean, the grain dry and blasted, and no better than chaff ; they will feed upon all kind of grain. When the farmer finds them upon his land, his only method will be to boil wormwood, or centuary, in water for two hours ; then before sun-rise or after sun-set, with a whisk, sprinkle the corn when just out of the ground with it ; any bitter concoction will answer the same end, the Grafshopper being an enemy to any thing bitter.

When we consider well the many obstructions and disadvantages the farmer lyes under, through the innumerable quantity of insects and vermin which the corn is liable to be destroyed by, when first sowed, after it is in the ground, when it first appears above the earth, while in ear, (perhaps you may add a blight,) when ripe by the winged race, and when in the barn by Rats, &c. I say, when we consider these things, for my part I really wonder we have any corn brought to market.

Nay, we have birds which are not satisfied with destroying the corn at one particular time, for they devour it at three different seasons ; when first sowed, when it appears above ground, and when ripe ; yet some farmers say they do good ; I grant it, they do, when they can be kept to eat Worms only ; these are the Crows.

Crows [Vol. I. p. 229. 349. 608.]

Are worse than Tithe-men, as they take their tithes at three different times a year for every acre of land. Some have

have a method of taking them with a pin crooked and run through Peas, or they keep boys to hallow; but boys are apt to sleep and play, and the neglecting of the land one hour, will give the Crows an opportunity of doing more mischief than the boy will do good in twelve months. I recommend the setting of different coloured feathers in a ring about five yards in circumference, in three different parts of the land, and no Crow will come nigh the place. Field-keepers are necessary just before the corn cometh ripe; gunpowder at no other time is of any service, unless you add shot and kill them, but some have a notion that Crows are shy of powder, and tell you they can smell it; and to shew how far this notion will carry a man—I remember, in the year 1769, that I met a farmer of Middlesex, dressed in his short coat, with every thing necessary for a day's shooting, going only to fire at Crows; I walked with him, and when I came to the field, I found it sowed with marrowfat pease, upon which was stuck numberless sticks ornamented with rags that had been white, which the farmer had changed the colour of by daily firing; I enquired the reason of his firing at the rags; he told me, that the linen held the smell of the powder for a long time, and that no Crow would come nigh the field whilst the smell remained; but alas! how mistaken was the farmer; for when the pease came up, he found that half the field was destroyed: And to prove how he wasted his time, and that Crows have no objection to powder, (though if you walk with a gun they appear shy, but that is from your sneaking after them), if you ride on horse-back with a gun in your hand, you may come within ten yards of them; Crows building in trees over the powder-mills, which are continually blowing up, is a convincing proof to me, that powder hath no effect upon them, for the blowing up of the mills not only shakes the earth, but scents the air for half a mile round. When
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farmers are pestered with Rooks, as Gentlemen keep Rookeries for the sake of hearing a continual noise, without the least benefit, and will not destroy them, after repeated complaints, then the farmer must take care of himself, for he may be certain the gentleman will not pay his rent, though his Rookery may in great measure have ruined him; I would then recommend a pound of arsnick beat fine in leather, put it into a tin pot or kettle with half a bushel of barley, or a smaller quantity of each; if your kettle is not large enough, when soaked a night take the barley down into the field the next morning, when you go to dung carts, and round every heap scatter a little barley, the Crows will follow the cart, and by the time they have eat it two minutes, you will find them tumbling in the air, and will pitch down as if shot; some will be so strong as to reach the Rookery, but they will die soon after, and the next day you will find them under the trees in a state of putrefaction; by this method, in less than a week, you may destroy a Rookery at the expence of two Shillings.

We have a number of winged vermin, which also pester the farmer, such as Hawks of many different kinds, Magpies, Buzzards, Kites, &c. The only method that can be taken is to shoot them, which you may with ease do by staking a chicken by the leg in your orchard, hide yourself within gun shot, and just before he strikes shoot him; a steel trap, baited with a Rat, Chicken, or whatever you find them devour, will take them.

The Weasel

Is something of the Ferret kind, but smaller; it will destroy Rabbits, Chickens, young Ducks, and suck eggs; you may always know when a Weazel has destroyed your Chickens, or sucked your eggs, for they always leave the carcass and shell behind them. You may set the common hutch trap,

trap, baited with a dead Chicken, or what they destroyed last, and you will be sure of taking him.

The Polecat, Fitchat, Fitchew, or Formet.

The same animal called by different Names in different Countries; he is of a mischievous nature, will get into hen-houses, and destroy Chickens, Ducks, &c. and if possible carry them away. The best method to take him, will be with a steel trap; observe well the way he gets into the hen-house, and at the hole place the trap, which cover over with earth as light as possible; be sure you place it so that he must go over it to get into the hen-house, which do at noon, that the earth may not smell of your hand, and to prevent any thing else from being caught in it, lay a piece of slit deal over the trap, which take off when you go to bed; you must either watch the trap, or rise before the poultry in the morning to prevent them falling into the snare; if you do not catch him the first night, cover the trap over as before-mentioned; if you have not a steel trap, the common hutch will take him, baited with a Chicken, Duck, &c.

The Stoat

Of all small animals is the worst; he will run through a whole brood of Chickens in a little time; he will destroy Hares, Rabbits, Pheasants, &c. his method is to catch them by the neck, and suck them to death. I have heard a War-riner say, (the truth I will leave my reader to judge) that he has often found Stoats hanging to the neck of both Hares and Rabbits, and have shot them with great ease while running. If you set the hutch trap, baited with any thing he last destroyed, and place it under a wall or pales, where they run in the night, you may take the Stoat; but observe when you set the hutch, to place a board from each
end

end of it slanting, so that the end farthest from the hutch may be two yards from the wall; thorns, or any thing of that kind, will answer the end, if laid properly, for the Stoat will avoid a trap only by going a little out of the way, but this method will lead him in by degrees.

The Fox.

This animal is so sly as to avoid almost every thing that is set for him; when the farmer finds he frequents his yards, the best method will be to examine well which way he comes; if you are in a doubt, take some sand and shake it lightly upon the ground, and in the morning you will find the impression of his feet; there set a steel trap, without any bait, cover it lightly over with earth, which take up with a spade, least he should smell your hand, and sift it over the trap; this you must do in the evening, when every thing else is gone to rest, least they should be taken in it: If you do not catch him the first night, lay a piece of slit deal over the trap to prevent any thing else getting nigh it; if you find him sly, take a little flower and honey mixt with the blood of any fowl or sheep, add ox-vomit or hemlock seed bruised fine, which make up in balls, and place it in three or four different parts of your orchard or yard where he comes, and it will immediately destroy him. You must be careful how, when, and where you put this mixture, for it will destroy every thing that feeds upon it; for which reason you must lay it late at night, and take it up before Sun-rise in the morning.

ARTICLE LXIV.

ABRIDGEMENT OF HUSBANDRY
ANATOMISED: By JAMES DONALDSON.

[Continued from our last, p. 476.]

CHAP. IV.

Of the Profit and advantage of Hedging and Inclosures.

AS heat is one principal instrument of the growth of grain and other produce of the earth, the promoting it ought to be principally attended to. That is done two ways; first, by restraining external cold; and next, by strengthening and assisting the natural heat of the earth.

External cold is restrained in a special manner by planting and hedging. From experience we may observe, that where the earth is sheltered from the violence of storms, as in an orchard or garden inclosed, or under the shelter of trees, it is more fertile than other ground alike in every other circumstance, this only excepted: Or even where there is a bush, or any insignificant shelter in an open field, the corn or grass that grows under the lee of it will be much preferable to the rest. On the other hand, we may observe, where the wind has a passage through the gap of a hedge or stone-wall, the corn or grass opposite to it is much inferior to the rest of the field. Numberless instances may be given to confirm this; so that we may safely conclude, that hedging and planting is an effectual method of restraining external cold.

The natural heat of the earth is strengthened and assisted by the application of dung or manures; of which I have spoken in the second Chapter: The application of these, will so warm and heat the earth, that it will produce grain and

and grafs without any fence : But where there is no fence or shelter from storms, the earth requires a greater quantity of dung to keep it warm : But where the earth is defended from storms, the less dung will serve. And seeing manure cannot be had to every piece of ground, these fields that are fenced will not require so much ; and so what can be had will serve the more. Wherefore, if, in the instance formerly given, four acres and a half was dunged every year by the dung of the cattle that were maintained upon the farm of 90 acres, we may well suppose, that where the ground is hedged or fenced, the same quantity of dung will manure one acre more every year.

Now, if one acre more can be manured every year, and the manure lasting four years, then four acres more corn may be had every year ; which being reckoned at seven bolls per acre, the produce formerly supposed, makes twenty-eight bolls more than before the farm was inclosed. But as four acres of that which formerly lay in grafs is now made into corn, it may be said that the profit is inconsiderable, seeing four acres of grafs are deduced for these twenty-eight bolls of corn : To which I answer, that as the whole ground is inclosed and warmed by hedging, so that the corn-land yields as good crops now when a fourth or fifth part of the dung is saved, as when it had the whole allowance before it was inclosed, we may by parity of reason conclude, that the grafs will also be a fourth or fifth part better than before it was enclosed ; so that the 44 acres of grafs remaining will be greatly better than the whole 48 were formerly ; yea, that though ten acres were taken off, the remaining 38 acres will yield more grafs than the whole did when it lay open.

Besides the twenty-eight bolls additional produce on the croft-land, we may suppose that the outfield, when inclosed, will yield a boll per acre more than it did formerly : However, reckoning it at half a boll only, that is eleven bolls from the twenty two acres, which, added to the twenty eight

eight bolls from the croft-land, makes thirty nine bolls ; and this at L. 5 per boll, is L. 195 more than the produce of this farm was formerly reckoned at.

The yearly expence is no more than we formerly reckoned, excepting the seed and labouring of these additional four acres taken off the outfield, for which we may allow L. 12 per acre.

From the produce of	L. 195 0 0
Deduce feed and labour of 4 acres at L. 12	48 0 0

There still remains	L. 147 0 0
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And in respect that the pasture ground is as much improved by hedging as the corn-land is, a greater number of cattle may be maintained on it ; consequently more dung will be made, and a further profit will also be made on the cattle themselves.

But I proceed to propose another step of improvement on this farm, in two ways ; first, by fallowing ; and secondly, by encreasing the quantity of manure.

The outfield was divided into three parts, whereof one third was proposed to be always in corn, and two thirds in grass. If the ground lye conveniently, I would subdivide each third part into three, and plow one of them, that is, about six or seven acres every year. If that cannot be conveniently done, I let it lye till the third year, and then I fallow six or eight acres of it some time in winter. About the end of April or beginning of May, I plow it over again, and let it take the drought for a month or more, then harrow it, and let it lye a week or two ; after which I give it a third plowing ; and after lying as before, and when the mould is again dried, I harrow it again. The advantage of this kind of labour is greater than can be well credited by those who know not something of it by experience : For first, by this frequent tilling and harrowing, the ground is made mellow and tender ; Secondly, all weeds, and grass that may extract the strength of the ground is consumed ; and by the by, I know of no better way to clean the ground

of that pernicious weed called Goole. Thirdly, It receives great benefit by the warmth of the sun-beams, by which it becomes thoroughly dried in summer, and thereby continues much warmer through the winter than otherways it would be. And, lastly, the dew and rain falling upon the earth, contributes to its fertility, from the salt quality which they bring along with them, and which remains with it, as it is not exhausted by any kind of plants growing upon it. And to confirm these arguments, let our farmers only consider, what is the effect of fold dykes; These, though made of the next adjacent earth, yet after being exposed to the sun and wind, rain and dews for a summer, and again, thrown down and spread on the place from whence it was spread, contribute to enrich it, and make it much more fertile than the other grounds that were not so dug up and dried.

The second point proposed is, to encrease the manure of the farm. For this end, I preserve the dung of the cattle, by bordering the dunghill round with a wall of earth, so that no sap may run from it; and I also take care that none of the urine of the cattle run away or be lost; for doubtless, there is as much strength in the urine as in the dung: And if there is not as much off-fallings of straw or litter about them as may retain it, it should be preserved in a trough or deep hole at the lower end of the cow-house or stable, and carried from thence, and poured from time to time on the dunghill. If there be any marle or sea-ware on the ground, or any place near by, as much of it should be procured every year, and laid upon the ground, till it be all gone over. But if neither of these can be had, and lime can be got, it must not be omitted; that should be mixed up with the dung, straw, old thatch of houses, clay, turf digged in some most convenient part of the farm and dried, and all other kind of rubbish that can be procured, and a dung-hill thereof formed upon some
convenient

convenient part of the ground that is to be fallowed. This should be the summer's work, and always when occasion serves. At the end of three years, when this six or eight acres field is fallowed, this dunghill should be spread out upon it: But if the ground is so situated that two or three acres can be fallowed every year, these acres should be manured with this compost regularly in their course.

After fallowing and manuring in the manner before prescribed, the ground should be plowed about Michaelmas, and sown either with wheat, rye, or winter-barley: And if the season prove favourable, ten or twelve bolls per acre may be expected without a miracle: For fallowing of itself, without any manure, will enrich any ordinary ground, so that for three or four years it will bear as much as if it had been dunged tolerably well: But this ground having never been manured before, and receiving now both a compleat fallowing and manuring, it is brought at once into excellent condition; and being plowed but three years and resting six, with the benefit it receives from the hedging by being kept warm, it will be in excellent condition; and if only two or three acres of the outfield is treated in this manner, in twenty or twenty-four years the whole outfield will be gone over, and brought to as good condition as any part of the crofting: So that from thenceforth, it need not lye more than three or four years at a time, and be plowed as long; whereby there will be eight or ten acres more in corn, than was formerly supposed; and each of these acres may reasonably be supposed to bring six bolls yearly, which is two bolls more on each acre of the twenty-two acres of outfield proposed to be plowed every year, than was formerly supposed,

Which is	-	-	-	44 bolls
And eight acres that formerly lay in grass, being now				
plowed, and yielding six bolls per acre, is	-	-	-	48
				92 bolls

Which at L. 5 per boll, is	L. 460 0 0
The expence of seed and labour on the additional eight acres now plowed, at L. 12 per acre, is	
L. 96, but call it	100 0 0
There remains of profit,	L. 360 0 0

But because the inclosing and hedging the ground, and purchasing this extraordinary manure, cannot be done without some expence, it ought in reason to be deduced from the product or increase that is had from the ground. Let us therefore enquire what that may be. And seeing we reckoned already four acres of croft and eight of out-field laboured more each year, than when we summed up the account on p. 474. and have allowed L. 12 for seed and labour on each acre; we must now deduce what was allowed on that account, and allow it in part payment of what charge I am at in keeping more men and horses, than were proposed for labouring the farm before it was inclosed; for since I am to reckon all the charge of men and horses that are to labour the whole ground, the expence of labouring these twelve acres comes under that account.

I allow one man-servant and two horses, or two oxen more to be kept on account of these twelve acres, than were formerly necessary. According to our first calculation, two horses require eight bolls of corn to maintain them; and for the man's meat and wages I shall reckon L. 80 or L. 90. There was a boy allowed for herding, when the farm was not inclosed, which will not be requisite now that it is inclosed: But I shall allow him to be kept, not only in summer, but in winter also, as he may serve to drive the plough: Now for his meat and wages, during the winter, (for his summer's keeping was charged formerly) I shall allow L. 40. Now these three men, that is the two formerly stated, and the additional one now to be charged,

and

and the boy, I reckon sufficient for labouring the ground, thrashing the corn, and dressing the garden, and doing any other work beside. For cutting down the additional twelve acres, I shall state L. 24. The account will then stand thus :

The remainder of the account stated on page 474.	L. 763	9	4
The produce of 4 acres croft-land at 7 bolls per acre, is 28 bolls at L. 5 per boll.	-	-	140 0 0
The additional produce on 22 acres outfield, more than was formerly reckoned, at two bolls per acre, is 44 bolls	-	-	220 0 0
The produce of 8 additional acres outfield, now brought into tillage, at 6 bolls per acre, is 48 bolls.	-	-	240 0 0
	L. 1363	9	4

Additional Expence.

Seed 12 bolls	-	-	-	L. 60	0	0
Horse meat 8 bolls	-	-	-	40	0	0
Additional servant-man's meat and wages	-	-	-	90	0	0
The boys meat and wages for the winter's half year	-	-	-	40	0	0
Additional shearers	-	-	-	24	0	0
Sum of additional expences				L. 254	0	0
Remains of clear profit.	-	-	-	L. 1109	9	4

In this account I have purposely omitted the additional profit that may be made of the cattle, now when the ground is enriched and inclosed ; as also what profit may arise from sowing clover, rye-grass, and rib-grass, and the profit that may be made of the orchard, which may contain upwards of seventy trees, each bearing a peck of fruit, which they may do even before they are twelve years old : But as I have reckoned nothing for lime, let these go to defray that and several other incidental expences, which can neither be foreseen nor brought into account.

[To be continued in some future NUMBER.]

THE
SCOTS FARMER,

SEPTEMBER 1774.

ARTICLE. LXV.

Of Fallowing or Faughing.

[From DICKSON'S AGRICULTURE, Vol. II.]

THE Author being to treat of schemes of management, informs, that we are thereby to understand the particular kinds of grain sown; the order in which these particular kinds are made to succeed each other; the particular place in the order of succession, where dung is introduced; and if fallowing is used, after what crop the land is fallowed, and what kind of grain is sown upon the fallow.

In almost every county of Scotland, a different scheme is followed, and often more than one in the same county. He proposes to illustrate these different schemes; examine the reasons upon which they are founded; and in the end, point out such improvements of these different schemes as seem obvious. But as in some of them fallowing is used, and in almost all of them, a change of species, or a succession of different kinds of grain; it is necessary, in the first place, to treat of these two things, and to represent the nature and design of them; for without this we cannot judge properly of the schemes in which they are used.

It is not many years since fallowing was introduced into Scotland; and there are many shires, where as yet it is but little practised. It is certainly a very great improvement. If there is any thing that can be supposed to suc-

ceed in all soils, and climates, it is this. Fallowing may be called plowing in perfection ; for, by it alone, all the advantages of plowing are acquired.

Plowing, as was shown in the first part of this treatise, serves to increase the food of plants, enlarge their pasture, destroy weeds, and remove wetness. * Now these advantages cannot be acquired in all their perfections, by any plowing that can be given betwixt harvest and seed-time ; and therefore, fallowing becomes necessary in order to attain them.

By plowing, the food of plants is increased, a larger and more uneven surface is exposed to the influence of the air : But if the surface is wet, as it commonly is in the winter season, little benefit of this kind can be expected. In proportion as soil is wet, it loses its absorbent quality, and when glutted with water, it is deprived of it altogether.

By plowing, the pasture of plants is enlarged ; but if land is plowed wet, it dries too fast when the dry season comes on, and thereby the pasture is made less than if it had not been plowed at all.

By plowing, weeds are destroyed ; but unless the weather is warm, the seeds of weeds do not vegetate ; and unless it is dry and hot, their roots are not destroyed.

By plowing wetness is removed ; by it land is laid up in the most proper ridges for this purpose ; but, in the winter, ridges cannot be altered, or even made flat, without danger. Thus it appears, that fallowing is of the greatest importance, and that, by it alone, the advantages of plowing can be fully obtained.

Fallowing was so much practised in the Roman Husbandry, that seldom any seed was sown but upon fallow. It is a practice that now prevails in many parts of Scotland, and is found to be a very great improvement ; in order to reap the greater benefit from it, it is necessary that the farmer

* Vol. I. p. 415.

mer attend to the situation of his land, enquire where the defects lye, that prevent it from carrying good crops, and manage his fallow in such a manner, as to remedy these defects. It will not be improper to give some directions that may be of use in this respect.

When land is poor and full of root-weeds, it ought to be plowed in the winter, or as soon in the spring as it is in a proper condition, that so it may have the benefit of the drought, and of the North and East winds, which are common at that season. It ought to be plowed in such a manner, as to expose the largest and the most uneven surface; because thereby the drought has the easier access to destroy the roots, and the winds have the easier access to impregnate the soil: The kind of plowing most proper is, in very narrow ridges, and very broad and deep furrows; because the narrower that the ridges are, and the broader and deeper the furrows, the larger and more uneven is the surface made.

It should be plowed a second time early in the summer, in the same kind of ridges and furrows; but across, if the situation of the land allows. This renders the surface still more extensive and uneven; and if in any places, by the former plowing, the earth of the furrows have been turned over whole, they are broken by the cross plowing, roots are better exposed, and the air has easier access

The third plowing should reverse the first, turn the crowns into the furrows, and the furrows into the crowns. This is better than plowing at random, without any regard to the first made ridges; for thereby the soil buried in the first made crowns, is more fully exposed by turning them into furrows.

Sometimes this kind of land rises in large clods, and continues in that situation, though exposed for a considerable time,

time to the influence of the air. This makes an after-plowing very difficult: And indeed, when a plowing is given to land in this situation, it serves little other purpose than to turn over the clods. In this case the heavy roller must be used immediately before plowing; which in some measure reduces the soil, and renders the plowing more beneficial.

If the fallow is to be dunged and sown with wheat, and if the surface is very rough, it will not be amiss to harrow and even to roll it, before the dung is laid on, and the land gets the last plowing or seed-furrow. The rolling breaks the clods, and the harrowing takes out the roots that remain; and as the land is to be plowed immediately, the harrowing is no disadvantage, even though all the roots should not have been destroyed. I need scarcely observe, that this operation of harrowing or rolling, should be performed immediately after a shower, as thereby it becomes more effectual, for the purposes for which it is designed. Clods upon the surface, after wheat is sown, do no harm; they rather do good; they afford a shelter to the young plants during the winter, and their mouldering down in the spring, as they always do after frost, affords a fresh supply of nourishment: But clods upon the surface, before the seed-furrow is given, prevent the dung from being equally and regularly spread, and render it difficult to plow with such exactness as the seed furrow requires,

When the fallow is intended for Lincolnshire barley, or even the common barley, and the seed to be sown on the winter-furrow, it may be treated in the same manner as when for wheat. But if it is not to be dunged, or if it is not to receive the seed-furrow till the spring, then in this case, though the land be rough, there is no necessity to harrow before the plowing in autumn: for the rougher that the surface is, and the more clods there are on the land

land during the winter, it is kept in better order, receives greater benefit from the air, and is sooner in a condition for being plowed in the spring. The clods, however large or numerous, are dissolved by the winter frosts, and the land is found free and open in the season of plowing. If the land requires to be early sown, as all stiff soils do, and it is proposed to lay on dung, it is proper to take the advantage of the winter frost for this operation. Even though the spring is dry, yet carriages cannot go with safety in that season, upon this kind of land.

When land is rich and full of the seeds of weeds, it should be managed in a very different manner. It may be plowed either in narrow or broad ridges, or even without making any ridges; but then it must be plowed in very narrow furrows, that so the mould may be broken as much as possible, the seeds exposed to the air, and the sap preserved. If the weather is moist, and the land mellow, it is not necessary to harrow immediately after plowing, the allowing the land to lye for some time after it is plowed, exposes a larger quantity of the soil, and consequently, a greater number of seeds to the influence of the air; and if the sap is not exhaled, a greater number of seeds likewise are thereby brought to vegetate. When the young plants appear, then is the time for harrowing. This operation not only destroys the weeds that have appeared, but it likewise exposes a new surface, and, by giving air to the other seeds, immediately produces another crop. But if the weather is dry, or if the land rises in clods, it is necessary to harrow immediately after the plough. This preserves the sap in dry weather, and it breaks the clods, and thereby gives air to the seeds contained in them; and without sap and air it is certain, that seeds will not vegetate. At what time the first furrows should be given to this kind of fallow, and how many plowings it should receive, cannot be determined. These must be left to the judgement of the farmer, who must determine from circumstances.

I shall only observe, that though it is a benefit to all kinds of fallow, to be plowed early and often, yet it is not necessary to plow this kind, either so early or so often as the other kind mentioned.

It may be observed, that the method of increasing the vegetable food by plowing, is different from the method of enlarging the vegetable pasture; and that the method of destroying root-weeds is different from the method of destroying seed-weeds: But the way of increasing the vegetable food, is nearly the same with the way of destroying root-weeds, and that the way of increasing the vegetable pasture, is nearly the same with the way of destroying seed-weeds. When the design of fallowing is to increase the food of plants, and destroy root-weeds, or when it is to enlarge the pasture of plants, and destroy seed-weeds, the way of managing the fallow is plain and obvious. But sometimes the land is in such a situation, that in fallowing we must have in our view things that require different management. Thus, it may have little vegetable food, and at the same time have a small pasture, or be full of seeds; or it may be full of roots, and at the same time be full of seeds or have a small pasture. When this happens, it is necessary to manage the fallow at first, as directed for land that is poor and full of root-weeds. It should be plowed, as soon as the drought in the spring comes on, in broad furrows and narrow ridges. In the beginning of summer it should be plowed across after the same manner: And after allowing it to lye for some time in that situation for the sun to destroy the roots, and the air to impregnate the soil, it should be reduced by the harrow and roller, which, with the assistance of a shower, will make all the seeds near the surface spring. After allowing time for this, it must be plowed again, in as narrow furrows as possible, and harrowed either immediately or some time after, as has already been directed, according as the situation of the land requires

quires. By the first two plowings, the soil is exposed to the influence of the air, and the root-weeds are destroyed; and, by the harrowing and rolling after the second plowing, and by the third and the harrowings attending it, the pasture is enlarged, and the seed-weeds destroyed.

When the fallow is intended for wheat, it gets the seed-furrow in course in the ordinary season: But if it is for barley or oats, it must be laid up in proper ridges before the wet season comes on; for it would be very hurtful to allow it to lye all winter with the surface smooth, and the furrows filled up, which is the situation of the land after harrowing. Oats or winter barley may be sown upon this furrow, if the land is stiff, but another furrow is necessary for spring-barley, or even for oats or winter-barley, if the land is soft and mellow.

As I have already hinted, it is impossible to determine exactly the number of plowings necessary for fallow. This must be left to the judgment and discretion of the farmer, according to the situation of the land, and other circumstances. I have endeavoured to assign a reason for each of those that have been recommended. In one case, when we supposed the chief design of fallowing to be the destroying of seed-weeds, neither the seasons of plowing, nor number of plowings, were mentioned. This must be regulated by the coming up of the weeds. When all the weeds, after plowing and harrowing are come up, that it is reasonable to expect from the situation of the land, then it should be plowed again. To plow before the weeds come up, serves no purpose as to the destroying them. If the land is soft and mellow, fewer plowings are necessary, for every plowing may be attended with more harrowings than one, and on land in this situation, harrowing has almost the same effect with plowing; for it destroys one crop of weeds, and makes another spring.

Perhaps

Perhaps some farmers, notwithstanding I have left much to their own judgment, may however think, that the particular directions I have given are to no purpose: I would ask such persons the following questions: Whether fallowing is an improvement? Whether the fallow receives any benefit from plowing? And whether there is any difference betwixt good and bad plowing? These persons must answer these questions in the affirmative, if they deserve the name of farmers; and, in consequence of this, must not they allow, that one way of plowing the fallow, may be more beneficial than another? I must acknowledge indeed, that the operations of the farmer in the management of his fallow, must be regulated by circumstances, and particularly by the season; and when I give directions, I mean no more than that the farmer should always have some end in view in his operations, and that he should promote that end as much as circumstances allow.

In the directions which I have given for the management of fallow, I have supposed that the land is in the situation most proper with respect to the height of the ridges. It is certain, that in many parts of Scotland, the ridges are both higher raised, and broader, than the nature of the soil requires. In the first part of this treatise, I have given some directions about the altering ridges*. To these, when ridges are too high raised, and too broad, it will be proper to attend. If this is done, it will not be found very difficult to reduce ridges in fallowing, as much as is necessary, and at the same time make the fallowing answer the other ends proposed.

Of a change of Species.

In the schemes of Agriculture practised in Scotland, a change of species is generally used. The advantages arising from it are chiefly these two; a more beneficial crop is produced, than if the same grain was repeated; and the land

land by the change may be prepared for a more valuable crop afterwards.

Some plants require more food than others ; some require more culture than others ; some feed near the surface, while others draw a considerable part of their food from a considerable depth ; it may be added, that some plants exhaust land very much of its vegetable food, while others take away but little, and that some encourage the growth of weeds, while the culture given to others destroys them. These things make it necessary to give attention to the manner in which the different crops are made to succeed each other.

Gain is what the farmer should always have in his view, in the way of managing his land. To raise the most valuable grain that his land can carry ; and to have good crops with the least labour and expence, is the certain way to gain : But how to attain these is the difficulty. The having such a succession of crops, as require the least culture in proportion to their value and goodness, as best discourages the growth of weeds, and as is most proper to keep the land in good heart, seems to be a proper way to attain them.

Wheat is the most valuable grain ; But a good crop of wheat is not to be expected, if it is repeated on the same land. It requires a great deal of nourishment, it greatly exhausts the land, upon which it grows, of its vegetable food, continuing near eleven months in the ground, it allows little time for culture, and root-weeds lying long undisturbed are thereby greatly encouraged,

Barley is the grain next in value ; A better crop of it may be expected than of wheat, if repeated on the same field. It is not more than three months in the ground ; it does not exhaust land so much of its vegetable food ; it allows time for culture ; and the growth of weeds is not much encouraged : hence we find that, in some parts of Scotland, it was a custom formerly to sow nothing but bear

upon some fields: But then barley is a tender plant, is a bad forager and a quick grower; the soil must be well reduced to enable it the more easily to find its food; for if it is not well nourished while young it becomes sickly, and never produces a good crop though the land may contain plenty of vegetable food; and therefore though a good crop of barley does not exhaust land so much of its vegetable food as a good crop of wheat, yet a succession of crops of barley, if the same culture continues to be given to the barley-land, may perhaps exhaust land as much as a succession of crops of wheat, while the culture is much more expensive. But then it may be observed, that barley is a very proper grain to succeed wheat. As the vegetable pasture is lessened, and root-weeds are encouraged by the wheat-crop remaining long in the ground; so by the culture given to the barley-land, this vegetable pasture is again increased, and these root-weeds destroyed.

Oats is the grain next in value to barley. Of late years they have become nearly of equal value*. Was it not that the barley is a more uncertain crop than the oats, this difference would still be less.

The oat is a hardy plant and a good forager, and therefore properly adapted to the cold northern climates and soils. Better crops of it may be expected, when repeated, than of wheat or barley. It does not exhaust land so much as wheat, nor does it so much encourage the growth of root-weeds, except it is sown in the same season. A very ordinary crop of wheat has more real substance than a good
crop

* The reason of this is obvious: The increase of the number of horses both for luxury and improvement has increased the demand for oats, and the increase of the duties upon malt, ale, and spirits, has lessened the demand for barley.

crop of oats: Besides, the oat-land receives more benefit from the air in the winter season, and less damage from the rain, than the wheat-land does. Perhaps it may be justly asserted likewise, that the oat does not exhaust land so much as barley. Land sometimes produces as great a bulk of oats as of any grain whatever; yet what is commonly reckoned a good crop of oats is inferior both in bulk and quality to what is reckoned a good crop of barley. Besides, the culture given to the barley-land enables the roots of the barley to search every part of the soil. For these reasons it may be expected, that a succession of crops of oats upon the same field, may turn out to greater advantage, than a succession of either wheat or barley. Agreeable to this we may observe, that it is a practice to repeat crops of oats successively for several years upon some lands. But these are lands that are not able to carry a crop of either barley or wheat by the culture given the oats, and the scantiness of the crop deters the farmer from risking a more expensive culture. It is probable indeed, that if proper culture is given this land, it may carry one crop of barley in place of one of the crops of oats: but then the expence of the culture necessary to reduce it to a proper tilth for barley, will do more than over-balance all the difference of the value of the crops. On rich lands oats very properly succeed barley, especially if barley has succeeded wheat. The damage done to the land by a crop of wheat in its lessening the vegetable pasture, and encouraging the growth of weeds, is in some measure repaired by the frequent plowings given to the barley, and therefore a grain that requires little culture very naturally succeeds.

Pease or beans is the other grain which we make use of in Scotland in a regular succession. Though a crop of pease is said to meliorate the soil, yet even this grain does not succeed when repeated. Pease extract much of their food from below the staple of the soil, where the pasture

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is small, and to which the grosser air does not penetrate. After the first crop, therefore, they cannot receive much benefit from this extraordinary pasture: On this account, a good crop is not to be expected if frequently repeated. Besides, the pea is a plant whose roots are easily loosed from the ground. It is this that prevents them from succeeding on land that contracts and expands much by sudden changes from wet to dry. Of this nature are all soils in which there is any great proportion of undissolved mofs. When land is much pulverized, the same effect is produced in a certain degree; and a good crop of pease seldom fails to bring it to this situation. But this it is needless to insist upon, as pease is a grain that no farmer ever thinks to repeat upon the same field.

A crop of pease does not extract much vegetable food from the land. The real substance of what is commonly reckoned a good crop of pease, is very little when compared with a good crop of wheat, or barley, or oats. Six bolls of pease upon an acre is reckoned as good a crop as eight or nine bolls of barley or oats, or even ten bolls of wheat; and in a boll of pease there is not that real substance that there is in a boll of any of the other grains. Pease draw a part of their nourishment from below the reach of the plough, and below the reach of the roots of the other grains. By covering the surface, they destroy the weeds and raise a fermentation, by which the pasture is enlarged. These effects of a crop of pease point out their place in a succession of different grains. They naturally come in after a crop of wheat or oats. The damage done to the land by the long continuance of the crop of wheat, or the little culture given to the crop of oats, is in some measure repaired by the crop of pease; the pasture that was lessened is enlarged, and the weeds that were encouraged are destroyed. A crop of pease is not so properly introduced after a crop of
barley.

barley. Barley leaves the land too well pulverized for a crop of pease; and although the pease should succeed, yet the beneficial effects of the pease-crop are not so discernable.

The effects of a crop of pease, as they point out what crops they should succeed, so they likewise point out what crops should succeed them: As they in some degree meliorate the soil, wheat or barley, which require much culture, very naturally succeed: Oats are improper, as they are good foragers, and need less culture.

Of the different Schemes of Management in Scotland.

There is a great variety of schemes of management. In some of these schemes fallowing is practised; and in some the land is never allowed to rest. In some of them, almost all the kinds of grain used in Scotland, are made to succeed each other; and in some of them, very few kinds of grain are sown. In some, the sowing grass seeds for hay is a part, and sometimes there is an attempt to raise a crop of turnip or potatoes on the fallow.

The arable lands in Scotland, are divided into infield and outfield. Formerly the infield was kept constantly in tillage, and a crop sown every season: Upon this land was laid all the dung produced by the farm. The outfield was in tillage and pasture alternately, commonly three crops of corn taken, and allowed to lye from three to six years in grass. Seldom any dung was laid upon this land; sometimes indeed, the cattle were folded upon it, and then four or five crops taken instead of three. On this land, oats were the only kind of grain that was sown.

The outfield land continues still to be managed in the same manner as formerly; but, in many places, a much better way of managing the infield land is introduced. It is sometimes fallowed, and sometimes sown with grass-seeds.

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By this kind of improvement, and the assistance of lime, marles, and other foreign manures, the outfield land is turned into infield. The different schemes of management upon the infield land, are what I propose chiefly to examine.

The scheme of management upon the outfield land seems very proper, and is not capable of improvement, except the soil itself is improved. The land is poor : The taking more than three crops would not answer the expence of management ; and the taking these three is more advantageous than the allowing the land to lye always in grass, and the allowing it to lye some years in grass is necessary, that it may recover after being exhausted by the crops, and that the quickening grass, encouraged by the tillage, may be destroyed*.

Of the Scheme in which Wheat is succeeded by Barley, Oats, and Pease, in their order, without a Fallow.

Was this treatise by accident to fall into the hands of a farmer upon the continent, or even of a farmer in one of the counties of England, where agriculture is supposed to be brought to the greatest perfection, it would not be an easy matter to make any of them believe, that land in Scotland continued to be cropped in this manner, and that the crops continued to be worth the expence of seed and labour. Yet it is a truth well known, that this was the scheme of management in several places upon the infield land ; and even, without the benefit of city-dung, the crops were not despicable.

It is not my design to recommend this practice : All that I propose is, to show the reasons for the succession of crops in the order mentioned.

Wheat, as has been already observed, continues long on the

the ground : By this the vegetable pasture is lessened, the growth and increase of weeds are encouraged. Wheat requires much nourishment ; hence, by a crop of this grain, the land is much impoverished. Now, the culture given to the crop of barley that fallows, in some measure repairs these damages done by the crop of wheat. The wheat is early reaped ; and the first plowing for the barley, given before the dry season is over, destroys the roots of the weeds, and covers the stubble. The land being plowed dry, rises in clods, by which a large surface is exposed to the influence of the air, and a supply of vegetable food acquired ; and, what is likewise of great importance, the land is exposed to the winter frost, and the pasture enlarged. Hence it was the universal practice of the persons that prosecuted this scheme, to begin their plowing by fallowing the bear-land, (which is the name that this plowing gets,) even in the time of harvest, and sometimes before the wheat-crop was carried from off the ground. By the second plowing in the spring, called steering the bear-land, when done with judgment, the pasture is further enlarged ; and, by exposing a new surface, a further supply of vegetable food is acquired : And, when this plowing is fallowed by a harrowing, the seeds of weeds are encouraged to vegetate.

The seed-furrow destroys these weeds, and further enlarges the vegetable pasture. Thus it appears, that a crop of barley, when the land is cultivated in this manner, is very proper to succeed a crop of wheat.

A crop of oats as naturally succeeds a crop of barley, as a crop of barley succeeds a crop of wheat. The culture given to the barley-crop, makes the soil soft and mellow, and in some measure destroys weeds. This grain therefore may be followed by another that requires less culture than the barley, and gives greater encouragement to weeds ;
such

such are the oats. They require less culture than the barley: The land designed for them, seldom receives more than one plowing, and yet good crops are often reaped. Oats therefore after barley, offer the farmer a valuable crop at a small expence.

A crop of pease, as naturally follows a crop of oats, as a crop of oats follows a crop of barley. By the little culture given to the oats, and the length of time that the crop is on the ground, the land is exhausted; by the land continuing long untouched, the growth of weeds is encouraged, and the pasture lessened. A crop therefore should follow the oats that repairs these damages. This is done by a crop of pease. Pease require little nourishment; they mellow the soil hardened by reason of the little culture given to the oats, and their continuing so long on the ground: and they destroy the weeds, which were encouraged by that crop. And the pease having thus mellowed, cleaned, and prepared the soil, are very naturally followed by wheat.

In this scheme of management, there is no fixed crop to which the dung is applied. Sometimes to the pease, sometimes to the wheat, and sometimes to the barley. It is not possible for the farmer, except in some very particular situations, to procure as much dung as is sufficient for one of the four grains which he sows, and therefore he can have no regular or stated way of applying the dung. The only rule which he has, and which indeed is not a bad one, is to dung the land that seems to need it most, without any regard to particular crops. However in a farm managed in this manner, there must always be such a quantity of the land in bad order, as to make it difficult for the farmer to determine where he shall apply the dung, unless he has laid down some scheme, upon which he is to proceed: And it is probable, that, by a proper management of the dung, the same quantity may have a better effect, and the land be kept in better order.

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As wheat is the most valuable grain, it may possibly be alledged, that it deserves the greatest attention and best culture; and therefore, that the dung ought to be applied to it. When land is much wore out, it is certain that a good crop of wheat is not to be expected without dung; and therefore, when the farmer, notwithstanding the situation of the land, still persists in his scheme of sowing wheat, then indeed dung seems to be absolutely necessary. But there are some disadvantages and inconveniences that attend the applying the dung to the wheat-crop, which I must take notice of. It crowds too much work immediately after harvest, and either occasions the plowing of the barley-land to be delayed, or renders the sowing of the wheat itself too late. It does more, it delays, in consequence of these, the plowing of the oat-land, and turns the cattle and servants idle, if there should be frost in the winter to prevent the plows from going. But this is not all: If, in consequence of a bad crop of pease, the quickening-grass has increased greatly, as is frequently the case, then the dung applied to the wheat-crop, unless it makes it so strong and rich as to lodge, encourages this grass; and this, tho' the wheat-crop may be tolerable, must endanger the crop of barley that follows. I would therefore advise the farmer who follows this scheme of sowing wheat always after pease, that, when the pease crop fails, and discovers to him the absolute necessity of applying dung to the wheat, that he plow down the pease; or, if he cannot conveniently spare the straw, that he mow them immediately before harvest. By this means, it will be in his power to give his wheat-land two plowings if he pleases, and to dung it without being obliged to delay any of the necessary work after the harvest, and thereby he will remove almost all the inconveniences that attend the applying dung to the wheat.

When the land is naturally very rich, as all land ought to

be, that the farmer pretends to manage in this manner, and consequently very much infested with weeds, the applying the dung to the pease crop is very proper. By this a good crop of pease is secured, and by a good crop of pease the weeds are destroyed, and the land is mellowed, and properly prepared for wheat, so that a tolerable crop of it may be expected likewise. But when the land is proper in its nature for pease, and seldom fails to produce a good crop, this, in some measure, secures the crop of wheat; and therefore in this case, it is best to apply the dung to one of the other crops.

Barley is a crop to which the dung may be applied very properly when the land is of such a nature as to allow it to be laid on with safety: But if it is stiff or wet, unless when there is frost in winter, or the spring remarkably dry, carts cannot go upon it without great danger. These circumstances should be attended to by the farmer, and, from them, he will be able to judge to which of these crops he can apply the dung with the greatest success.

Though I have insisted upon this scheme of management, yet it must appear to every intelligent farmer to be a bad one. It is impossible by it, without having dung at command, to keep the land in good heart for many years, and though the land should continue rich, yet such encouragement is given to weeds, that they must annually rob the crop of corn, of a great part of its nourishment. Besides, in this scheme, there is not a proper succession of labour. There is indeed a proper enough succession from the harvest to the end of the seed-time. Immediately after the wheat crop is cut down, the barley land is fallowed; to this succeeds the plowing of the land for wheat. After the wheat-seed is finished, such of the oat-land may be plowed as needs most to be mellowed by the winter-frost. If the plowing is stopped by the severity of the frost, the dung may be laid on, whether it is intended for barley or pease. When the frost is gone, the remaining part
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of the oat-land is plowed, or the land for pease, according as circumstances require. When the pease and oat-feed are finished, the barley-land gets the second or steering furrow, as it is called, and to this the feed furrow succeeds, which last operation may be continued till near the end of May. If the dung intended for the barley, has not been laid on during the winter, the situation of the land must determine at what time afterwards, whether before or after the steering furrow; it is the same thing which of them is done as to the succession of the labour. Thus far there is a proper succession; but from the finishing of the barley-feed to the beginning of leading in the corn, there is little employment: and indeed in the last age through the whole summer, the farmer had no employment for his servants and cattle, but cutting thistles and driving a few necessary carriages.

Of the Scheme in which Wheat is succeeded by Barley, Oats, and Pease, in their order, with a Fallow.

If land is very rich, and produces a great deal of dung, or if it lies in the neighbourhood of a city from whence dung may be carried, and at the same time is so dry situated as to receive the full benefit of plowing, it may be managed in the manner mentioned in the preceeding chapter, and produce tolerable crops. But, however, from what has been said in the chapter of fallowing, it must appear that this operation must be an improvement to every soil; and indeed, from experience, it is found to be so. Besides its being an improvement, fallowing tends to the oeconomy of the farm, a part of the land is plowed, and a part of the dung carried out in the summer season, and consequently less to do in the winter; and what ought not to be forgotten, when there is fallow, foreign manures, such as lime or marles, can be more conveniently applied.

The point which falls naturally to be considered here,
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is the particular advantage of fallowing according to its place in the succession of the crops, in the order already mentioned. The place into which the fallowing is commonly introduced, is betwixt the wheat and the barley. The land exhausted by the wheat-crop is recovered, and the weeds encouraged by that crop are destroyed by the fallow; and thus it is brought to a proper situation for the barley-crop; especially if dung is laid upon the fallow, as is commonly done.

The only objection that occurs to me against this practice is, that least attention is given to the wheat-crop, which is always considered as the most valuable. When the wheat-crop is immediately before the fallow, the soil is in a worse situation for it than for any of the others. But, in answer to this, it need only be observed, that it is very difficult to make any satisfying calculation of things of this kind. If a farm is situated in a country where there is little demand for any grain except wheat, then a particular attention is to be given to the culture of it above any other grain. But this is not the case in any part of Scotland; there is commonly as great a demand for the other grains as for wheat, at least for barley and oats; and therefore these have as certain and fixed a value as wheat has; and, in every scheme of management, as much attention ought to be given to the crops.

If we consider the fallow with respect to the whole crops, we will observe that the wheat does most hurt, by being placed next to the fallow. We may very justly suppose, that weeds are always upon the increase from one fallow to another. Now, if the wheat is immediately after the fallow, the weeds make quicker progress at first, than if the barley is in that place; and therefore the wheat must do more harm to the other crops by being before them, than they do to the wheat by being before it.

Although fallowing is now become a general practice in many places, yet there are but few persons that regularly
fallow

fallow every fifth year. Those who do so, and follow the order of succession already mentioned, always place the fallow betwixt the wheat and barley. It cannot properly be introduced in any other place: Not betwixt the barley and oats; for the barley receives an extraordinary culture, and the oats require but little: Not betwixt the oats and pease, for the pease require no more culture than the oats, and in some degree of themselves meliorate the soil; and not betwixt the pease and wheat, for if the pease-crop is good, the land is thereby tolerably well prepared for wheat.

In many places where fallowing is practised, land is fallowed only once in seven, eight, or nine years. In this case, the fallow may be properly introduced in a different manner, and yet the same succession observed, at least, for the first four crops. When more crops than four are to be taken, wheat may be sown after the fallow and the other crops in their order; but it is improper to stop immediately after one rotation, because the last of the succession is pease. The kind of crops that should follow, depends upon the situation of the land, and the number intended by the farmer. before he fallows again. If he proposes to take four, then the wheat must be omitted; after the first crop of pease, barley must follow, and the others in their order ending with wheat. If he intends to take three crops, and the land is in good order, he may take the three next in rotation, wheat, barley, and oats. If the land is not in good order, and yet the situation of the farm makes it necessary that three crops be taken before the fallow, then it will be proper to change the order of the succession, and take barley, pease and wheat. These three are not so severe as the others, for there is a crop of pease in this case in place of a crop of oats in the other. If he proposes only to take two crops after the first rotation, those that fall naturally are barley and oats; and if only one, then it may be either wheat or barley. Thus, if the farmer takes eight crops after the fallow, he has two
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of each grain, beginning and ending with wheat ; If he takes seven, he has either one of pease or of oats, and two of the others, as he thinks his land in good or bad order : If he takes six, then he has one of wheat and one of pease, and two of barley, and two of oats : And if he takes only five, he has two of wheat, or two of barley, and one of the others.

In all the above cases, we have supposed that the farmer introduces his fallow immediately before the wheat, and that this obliges him, in observing the order of succession mentioned, to take more than four crops, before he falls again. Sometimes the farmer, when he introduces his fallow immediately before the barley, though he can very properly introduce it again after four crops, yet thinks it proper to take more than four. If he chooses to take eight, he takes two rotations in the order mentioned, and thus has two crops of each grain beginning with barley, and ending with wheat. If he chooses seven, he omits the oats in the second rotation, or he omits the wheat, and changes the order ; after the first crop of wheat, takes pease, barley, and oats. If he chooses six, goes on in the order, and stops after the second crop of oats, and has only one crop of wheat and one of pease ; or after the first rotation, alters the order, and takes pease and wheat, or pease and barley. In this order of succession, the farmer seldom takes five crops, either contents himself with four, or takes more than five.

It will naturally be remarked, that, in none of the above schemes, we suppose the fallow to be introduced immediately after pease or barley. When land is in bad order, whatever crop it has carried last, it should certainly be fallowed, and this is agreeable to the practice of some farmers ; but when they do this, it is commonly when these crops have not succeeded so well as they expected ; and therefore this is not to be received into a general scheme.

scheme. In these schemes mentioned, every crop is expected to be good for the nature and situation of the soil, and when they are so, after a crop of pease or barley, another good crop may be expected; for pease are supposed to meliorate the soil, and the culture given to the barley is of use, not only to that crop, but also to the one that follows; and therefore to fallow after any of these crops is either, in some measure, to lose the melioration given to land by the pease-crop, or part of the advantage arising from the culture given to the barley.

Perhaps it may be expected, that we should be more particular in inquiring into which of the two places mentioned the fallow should be introduced, whether immediately before the wheat or before the barley.

It has already been observed, that wheat is the principal and most valuable grain, and requires the highest culture. This is a reason for sowing this grain immediately after the fallow. It has been observed likewise, that wheat exhausts the land most, and gives the greatest encouragement to the growth of weeds. This is a reason for sowing the barley immediately after the fallow. Whether the one or the other of these reasons should prevail, depends upon circumstances. If there is a more certain market for wheat than for the other grains, and the land from its situation not very apt to run into quickening grass, and other weeds of the same kind, then wheat may be sown; but if the market for the other grains is as certain as for wheat, and the land infested with weeds, then the barley should be preferred. But supposing that the value of an equal number of crops in both ways are equal; in this case, barley after the fallow should be preferred likewise; because, by this method, less labour is required. The barley after the fallow, requires no more plowings than the wheat after the fallow; but the barley when after wheat requires three plowings, whereas wheat after pease receives but one.

ARTICLE.

ARTICLE LXVI.

FARMERS KALENDAR.

OCTOBER.

Hiring Farms.

THIS is the month for hiring and stocking farms, and moving from one to another. Upon such occasions, the farmer should have all his senses about him: he should be equally clear-sighted to all the advantages of a farm, and all the disadvantages, that he may be able to draw a balance between them, and compare that balance with the rent demanded. Let him remember, that he must equally discard a too solicitous prudence, which doubts every benefit, and a too daring courage, which over-looks or lessens real evils. It must be open to almost every person's observation, that the common farmers lose themselves very much in deliberating concerning a farm: they have so many mistaken rules of judging, that we very often see them reject farms that, soon after, prove the fortunes of such as hire them: they are very apt to take one false guide in particular, the success of the last tenant. If a man makes a good deal of money on a farm, or leaves it for a much larger, numbers will immediately apply with great eagerness to get it, almost without viewing; but, if a tenant or two breaks, or is poor on a farm, most of the neighbours consider little further; they attribute all to the land, and avoid it, under a strong idea, that, without a fall of rent, no money can be made on it. All these notions are absolute absurdities; for the management of various farmers is so essentially different, that success depends very little on rent. A farmer, with a proper sum
of

of money in his pocket, hires a farm, and thrives on it; another, with an hundred pounds less, hires it, and starves. Two farmers of the same substance: one manages his land with spirit, makes all the manure he can, sells no straw, does not cross-crop his fields, drains them, and keeps his fences in good order; he grows rich. The other, a sloven in these particulars, falls into poverty on the same land. These are the circumstances, that make one man rich, and another poor; very seldom rent: and surely it must be apparent, that succeeding occupiers judging of the respective farms by the different success of these farmers, is the taking as blind a guide as they can possibly fix on.

Let the farmer, that is debating whether he should hire a farm that is offered him, examine the soil well, to be able to determine its nature, the stiffness, moisture, exposure, levelness, slope, stoneyness; what draining, manuring, fencing, &c. &c. will be wanting; let him see to the roads, distance of market, prices of commodities, labour, &c. let him fully acquaint himself with the state of tythes or gathering; if the latter, let him at once reject the farm. He should know the poor rates, attend to the compactness of the fields, and consider well the covenants relative to the cropping them; for many such are extremely detrimental to a good conduct of the land.

One general rule in hiring a farm should never be forgotten: fix on good land, and you can scarcely pay too much for it; but, for poor soils, the least rent is too high to be consistent with profit. By *poor soils*, however, are not to be understood such as have a command of lasting manures, that work great improvements, nor waste lands that, under that false denomination, are often found the richest of all.

The mellow, rich, putrid, crumbling clays, or rather clayey loams, are of all soils the most profitable: such as

will admit tillage soon after rain, and do not bake on hot gleams of sun coming after heavy rains, when fine harrowed; such land is better worth twenty-five shillings an acre, than many soils deserve a shilling.

Another matter of great import, in the hiring a farm, is the taking no larger a one, than the sum of money a man can command will stock properly. A common fault among farmers is the hiring too much land for their money: they are extremely eager to farm as much as possible: the certain consequence of which is the conducting the soil in a slovenly, imperfect manner. A farmer should never desist from any work, which he knows to be right, from a want of money; and he can only prevent such a situation, by hiring no more land than he can manage in a masterly manner: For let any of them consider the difference between good and bad husbandry in all its branches, between the loss of one, and the certain gain of the other. Making a proper use of natural manures, such as marles, clay, chalk, &c. is never done but by farmers that have plenty of money in their pockets. In the neighbourhood of great cities and towns, variety of manures are to be had, in some places cheap; but, if the farmers have not money, how are they to make use of such advantages? For these, and many other reasons, a farmer should never think of venturing on a tract of land, which he cannot absolutely command; that is, farm as seems best to him.

Servants.

This is the time that farming servants are chiefly hired, and the attentive cultivator should consider well, before he determines on the number or the quality of his servants; for it is no unimportant or trifling part of his business to conduct this matter in a proper manner, and with a due eye to the nature of his farm. A considerable
business

business requires the employment of a bailiff;* and, as such a servant may have material effects on the conduct of a business, it is always right in a farmer to consider the nature of his own case well.

If his farm is extremely large, if his culture is very complex, occasioning as much business on one acre as five; or, if he is absent a considerable part of the year; in these circumstances, the employment of a bailiff is absolutely necessary; but there are so many sorts of bailiffs, that a man may qualify the measure almost into that of hiring a common servant. A working bailiff is but a step above a common head-man, answers extremely well for a small business; but, in a large or complex one, will not answer. In such a farm, his business is to be perpetually on the watch on all the people, of whatever sort, employed: consequently, he must not work, which confines him to one place, but employ himself totally in moving from one set of workmen to another: Instead of labouring himself, his business is to see that others labour as they ought.

This part of his employment renders it necessary, that he should be of a rank something above the best sort of servants and workmen; for, if one from that class has the command given him, he will not be obeyed as he ought: a bailiff should ever preserve a due authority over all the people employed; and, for this purpose, his master would find it very useful to allow him to hire his own servants and labourers; or, at least, to give him liberty to turn any of them away when-ever he pleased. The great use of such a train of conduct is, the farmer's having only one person to deal with. Suppose he chuses to have any extraordinary work done, either in quantity or manner, a bailiff must be supposed to be far more willing to second his views, who does nothing himself, than common servants and labourers,

* In Scotland we call him a Grieve.

bourers, whose labour effects the whole. In that case, and all others, a farmer should give his orders to the bailiff, not the men. Let him order such and such fields to be plowed four inches deeper than common, or all his ploughs, for a time, to plow each half an acre a day more than common: never let him give such orders to the plowmen, but to the bailiff. Such an upper servant will not be able to see the execution of such orders, unless he has authority to turn away all offenders on the spot, and hire others that are more complying. And there is great reason to think, that a bailiff of that nature will be able to get more work done than any master in his own person, unless he is one that works with his men.

As to other servants, the principal is the plowmen; for on them depends, in a good measure, the success of all the crops. In a large business, it will be very difficult to have all good hands: but a man should aim at it as much as possible: for a bad plowman, commonly so called in the country, makes very indifferent work, but skims over the land in an irregular manner, and rids balks half he goes over. But let me remark, that the men, who have in general the reputation of being good plowmen, commonly found it on straight or level plowing; both which are excellent ingredients, and absolutely necessary; but depth should also be considered. In some soils, if a man comes after a bad plowing farmer, he may new-manure all his land by plowing a few inches deeper than common; but most plowmen have an aversion to plowing deep; nor can you ever depend on its being done, if you do not, or your bailiff, watch them perpetually, and insist, in the most peremptory manner, on what you require being executed. This is one of the points, in which, if you keep a bailiff, you must give him your particular orders, and look to him for the general obedience of all the men, allowing him to turn away those that disobey his commands; and

and do not forget, that this is an object (deep plowing) that cannot be too much attended to on many soils.

If no bailiff is kept, you must be much more attentive in the hiring your plowmen; to chuse such as will probably be induced to obey your orders, without that round of murmuring and complaints so often heard from these people: if you do not get docile people, you will find great difficulty in having your land managed in the manner you like best. Shepherds, hog-herds, cow-herds, driving-boys, and all other servants, are now hired; and, as characters are scarcely ever given among farmers, it much depends on your quick judging of the accounts the fellows give of themselves; and, perhaps, their physiognomy may be of some use.

Farm-Yard.

This being the last month that cattle will either be in the fields, or fed on green meat at home, the farm-yard should now be in perfect order to receive them. For directions as to the Farm-yard, see our Vol. I. p. 125.

The Teams.

About the latter end of this month, the horses must be put to dry meat; that is, hay, oats, and chaff. Here begins the great expence of horses; for they must be fed at a considerable cost, or they will fall off in flesh, so as to be able to do but little work. The best of hay should be given them, and as much of it as they can eat; also as much chaff as they can like: that arising from the crop, if there is enough of it; if not, straw and hay cut into chaff: as to oats, if the horses are worked as constantly as they ought, they should be allowed two bushels *per* horse *per* week, which will be no more than sufficient to keep them in good heart, and make amends for the loss
of

of lucern; with this food they may be hard worked every day throughout winter.

But this system of feeding is expensive, and there is a way to lessen the cost greatly, which is substituting carrots instead of oats, or, at least, instead of the greatest part of the oats. It will answer extremely well to give two bushels of carrots for one of oats: for instance; instead of a quarter of oats to four horses, to give them two bushels only, and twelve of carrots. The proper manner of giving them, is to wash them quite clean when used, and then to chop them in pieces, and put them into the manger, with plenty of chaff: they will keep the horses in as good heart as oats, and upon an average, in much better health. If you apply the chief of your carrot crop to other purposes, still you should determine to allow a small quantity weekly to all your horses, for the mere purpose of keeping them in good health.

The ox teams should be kept on straw and cabbages, and in default of the latter, on turnips; but cabbages are much superior. Let them have good barley or oat straw always in their racks, and allow them about fifty pounds of cabbages each *per diem*, if they are large beasts; When you work them very hard, change the straw for hay. The vast saving of using oxen instead of horses, lies in the winter food: an ox, with this management, will do abundance of work; but a horse could not be so managed at all.

Lay it down as a rule to keep both constantly at work: there is not in the range of your business, especially if most of your farm be arable, an object that requires more attention, or one which, neglected, will make you suffer more severely. It is the custom of some farmers to feed their horses variously, proportioned to their work, giving them no corn when they do not work, and many of them only straw; but this is a bad way: for a horse that is not always kept well, cannot perform much work

work when it is wanted : the best way is ever to feed them very well, and keep them constantly at hard work.

Cows.

The dairy of cows are now to be taken into the farm-yard, where their food must vary according to their state : the dry one must be put altogether to hay, and those in full milk, in another yard, to cabbages, which it is absolutely asserted, on experience, will give no disagreeable taste to the milk ; but they must have good straw given with them. Young cattle should be put with the cows in milk, as they cannot be kept too well. On no account, let any of these cattle out of the yards ; they only poach and damage the grass fields, and lose flesh in worrying after a few mouthfuls of grass.

Fatting Beasts.

This is the proper time to take the large fatting oxen, that have had the summer's grass, and put them to turnips, cabbages or carrots : turnips with hay will do ; but not near so well as cabbages or carrots : both which will fat a large ox as well as any food in the world. You may either stall-feed them under cover, or let them be loose in a straw-yard, well littered in either case ; and, if the latter, they should have open sheds to retire under at pleasure.

This saves abundance of labour ; for, if the beast is stall-fed, he will not thrive well, unless he is kept quite clean ; and they dung and stale so much in fatting on any of these foods, that the quantity of litter they soil is surprising.

This is also the month for purchasing lean beasts of the smaller sort, for fatting totally on the same articles of food, particularly turnips and cabbages. In the months
of

of *October, November, December, January, February, March, and April*, they will become as fat as their size will admit ; that is profitably so for selling to the butcher. It is this plan of appropriating the turnips and cabbages of a farm to fattening beasts throughout the winter, in a well-littered farm-yard, that converts the straw, fern, stubble, &c. into mountains of dung, and improves the land more than any other method whatever.

Hogs.

Now also put your full-grown hogs to fat : a business as profitable, particularly in respect to the improvement of a farm by dung, as any that can be undertaken. In this matter, a farmer (unless the price of corn is very low) may take some trouble, and yet make no great profit ; but I do not conceive, that profit on the hogs can be his view. If he gets the market price for his pease, barley, beans, buck-wheat, &c. and saves carriage upon them, at the same time getting a fair price for his swine lean ; he certainly makes a considerable profit upon the whole transaction, though not an immediate one, as the mere fatterer of hogs : but, what is of much greater consequence, is the raising of rich and most valuable manure, much better than can be gained by any other means at home ; for hog dung far exceeds that of any other cattle. Upon these general principles, which I apprehend are so just, that nobody can contradict them on experience, it is not only expedient to fat the hogs bred on the farm, but also to purchase others lean, as many as are necessary for the consumption of the pease, beans, barley, and buck-wheat of a farm. I speak of small farms and middling ones ; not very large ones on a barley soil, where that grain is the principal crop. And further, carrots and potatoes are roots that will fat a hog nearly

nearly as well as any grain, and at the same time to vastly greater profit than any corn or pulse ; for the product of them is so very considerable, that one acre of land, so applied, will go further in fattening swine, than many acres of the best grain. Let therefore the industrious husbandman every year plant a field of potatoes or carrots for fattening hogs, which will do it to great profit, merely on the swine, but much more so consequentially in dung.

Sheep.

October is a proper time for buying in wethers in pretty tolerable order for fattening on turnips and cabbages, which is a very profitable application of the crops. If the land is very dry, it will be adviseable to herdle off parts of the field, and give them to the sheep successively ; but, if the soil is at all wet, they must be given on a dry grass field. In either way, you work a very great improvement of the land, either of the field in which they grow, or of the grass one, in which you feed them. Keep these wethers fattening untill April or May, when mutton sells better than at any other time. This cannot be done on turnips ; but on cabbages it is every day practised.

Manure Grass.

This, as well as the preceeding month, is an excellent season for spreading manure on grass lands, nor should it be deferred later. In some counties, it is an article in the generality of leases, that all the dung of a farm shall be spread on the grass : but such covenants are totally contrary to the spirit of good husbandry. In the same idea is the obliging the farmers to lay a certain number of chaldrons of lime *per* acre on their arable land, to serve in lieu of dung. I will venture to assert, that all this is most execrable management, that it is a remnant of the

same barbarism as making horses draw by their tails. Lime, according to the best chemists, is no manure, but a mere forcer : where it meets with fertility to work upon, it forces the land to yield it for the nourishment of plants ; but, where little such nourishment is to be found, it is mischievous, as it forces the soil beyond its powers, and leaves it a *caput mortuum*, until enlivened again with dung, or enriched by other means. Hence the propriety of liming such lands, whose nature or management prevent the exhausting them of their fertility ; but those, which can easily be hurt by improper management, should never be limed.

The above-mentioned covenants, therefore, are diametrically opposite to common-sense ; obliging the farmers to dung their grass, and lime their arable, is a conduct that tends to the utter ruin of the latter ; for arable land is easily exhausted with the best management. What therefore must it be with constant forcing by lime, and no dung ? This system can only have arisen from ignorance of the qualities of lime. It is called a *manure* : these landlords have consulted the name alone, and ranked it with dung, whereas there cannot be two substances more unlike. Laying lime on grass land is very allowable, and a proper manure ; for old turf is always rich : the surface of roots is like a dung-hill, and it is generally acquiring riches ; but, with all advantages of this kind, yet in many pastures, the burthen of hay is by no means in proportion. Now lime being a forcer, and a dissolver of vegetable substances, it forces the surface of the soil to yield the crop more nourishment, and, by dissolving the old decayed roots, convert them into a manure. Let these effects, however, be as great as they may, still it is out of the power of the tenant to exhaust the land : he can only cut off or eat off the growth ; nor will it ever be in his power, though no dung be ever laid on it, nor any cattle ever fed in it, to prevent the soil being in the constant acquisition of fertility ;

tility; for that is the nature of a thick turf. Those who talk of hurting meadows by chalking and liming, speak against all principles. It is ever prudent to let the tenant do what he pleases with all his manures: he certainly must be the better judge, which field wants it most, and which will pay best for it. Obliging him to lay lime on his grass lands would not be objectionable: and as a tie, and the only one worth a farthing, state his course of crops. Lay a heavy penalty on two crops of white corn coming together; make him hoe all turnips, beans, pease, &c. The following courses exclude a fallow. and yet will always keep the land in good order: they suit both light and heavy lands.

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|------------|-----------|
| 1 Turnips. | 3 Clover. |
| 2 Barley. | 4 Wheat. |

And,

- | | |
|-------------|-----------|
| 1 Cabbages. | 3 Clover. |
| 2 Oats. | 4 Wheat. |

Let it not be imagined, that I am urging any thing against the general manuring of grass lands; on the contrary I am sensible, that it is most excellent management; but let not all the dung be so applied: form composts of turf, ditch-earth, marle, chalk, lime, and some dung: spread ashes, foot, and malt dust. Such manures are proper for grass, and will pay well.

Dig up Carrots.

In this month the carrot-crop should be dug up: some persons leave it till *November*; but, in case of wet weather, they suffer much by the delay. They may be taken up either with three-pronged forks or with spades, if the land is not hard, which it will not be, if the crop has been well cultivated; a little loosening of the earth with the tool, and at the same time drawing up the carrot by the top, will take them up very quickly. They should be left spread over the field till dry, which will be in a day or two:

two: then thrown into heaps and carted home; which moving will clear the dirt from them. Unload them in a barn or some out-house, and let the tops be chopped off, and given to the swine: then lay the roots where they are to remain. Some pile them up in a heap, and cover them with dry sand, others cover them with straw: they will keep very well, if packed close together in any building; and, if it be only a boarded one, cover them with something, enough to keep out the frost. Respecting the application of the crop, you must allow some for your horses, to keep them in good health, in which they are very efficacious. It is commonly said, that carrots will only give them fine skins; but that is a mere symptom of good health. Swine will pay you best for them: you may completely fat your hogs on them, and none will do better, look better, or eat better. Sows that have pigs may be kept on them; for they breed much milk. Oxen will fat to admiration on them; cows eat them greedily, and they give no ill taste to the milk, cream, or butter. Their use, in short, is universal: you can cultivate no plant that will answer more purposes.

Plow up Potatoes.

There is not the same reason for digging up this crop as for carrots: the plough among the latter is apt to cut, break, and bury them; but not so with potatoes: for it turns them over, damaging scarcely any; and, though, some will certainly be buried the first plowing, yet a harrowing will uncover many of them, and a following plowing most that remain: so that another harrowing will leave not one in a thousand covered; and the great advantage of this method is the tillage, which thus takes up the crop, preparing the land excellently for wheat, to be harrowed in directly, or for barley in the spring; if the latter, let the last plowing throw the land on to the small ridge, to remain

remain dry during the winter. If your potatoes are not for immediate sale, they must be laid up in a place secure from frost, which they are more liable to damage from than carrots. You will find it extremely profitable to apply them to winter-feeding various sorts of cattle, particularly hogs; they will fatten on them; sows with pigs, and weaned pigs; also the common stock swine; all will thrive on them to very great profit.

Lay up the Fallows.

This month must conclude the autumnal tillage on all stiff or moist lands; for, in the following month, they will probably be too wet: but on very light sandy soils, plowing goes on all winter. Now you should finish throwing the summer fallows, designed for barley, on to the ridge, to lie dry during the winter: the stubbles for a fallow next year, and those for turnips or cabbages, and the land designed for all sorts of spring corn and pulse, should now be compleated, Lay it down as an invariable rule, never to have a piece of stubble unplowed in November. It is of very great importance to leave your land for winter in such a manner, as the frosts will best get into it; which certainly is on the narrow ridge, a greater surface being so exposed; and the new-plowed ground will admit the influence of the air, of whatever kind, much better than hard-bound stubble lands: and by the frost pulverizing the land, it is in so much the better order, either for the crops designed, or for a fallow.

Plow for Carrots.

In *October*, the land must receive the first plowing, that is designed for carrots in the spring. Fix on the lighter soils of your farm; but, if you are in general on a light sand, chuse the stiffer fields: for larger crops will be gain-
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ed from a light loam, than from very light sands. Plow as deep as the land will admit, and do not fear of bringing up earth that never saw the sun before, provided it be not of a clung, stiff, clayey nature: the deeper you go in soil that will crumble, the better; for, as the carrot is all tap-root, it stands to reason, that it must require a very deep tillage. In this plowing, it is of great importance to possess a good plough, well made for the purpose of turning up the earth to a great depth. The farmers, where carrots are cultivated, use only their common plough, but go twice in a furrow; but this gains not near the depth that is really requisite, which is from eighteen inches to two feet: the best way would be to make a plough on purpose. With a proper plough, four horses twice in a furrow, or six once, will stir the land deep enough for the purpose. As soon as the plowing is finished, water-furrow the land thoroughly, so that it may lie as dry as possible all winter, and be ready to stir the sooner in the following spring.

Let the spirited farmer apply much of his land to the culture of carrots; for he will find no article half so profitable in his whole farm, as this well conducted. Few men will bestow attention or expence enough to cultivate this plant on a large scale, notwithstanding the undoubted profit attending it. A spirited farmer, that has money in his pocket, will introduce carrots instead of turnips, in his course, through his whole farm. He should, when his soil is proper, totally substitute them in the room of turnips; for it is no exaggeration to say, that one full crop of carrots will pay better than ten or turnips. It is much to be regretted, that better ideas are not more common, of the great profit of certain crops in husbandry, which, in a few hands, yield immense advantages, and would do the same in all, if equal attention was given.

ARTICLE

ARTICLE LXVII.

ABRIDGEMENT OF HUSBANDRY
ANATOMISED: By JAMES DONALDSON.

[Continued from our last, p. 532.]

CHAP. V.

Of Stock-keeping, and the breeding of Horses, Cattle, and Sheep.

“**T**HAT which will feed two, will hunger “three,” is a proverb in every body’s mouth; and yet there is scarce any thing less believed, if we may take peoples practice for any interpretation of their minds; for as I formerly observed, the pastures thro’ the most of the kingdom are overlaid, and the cattle in a manner starved. I therefore recommend to all stock-keepers, to keep no more cattle than they can plentifully maintain; for two cows well kept will yield more profit than six, as they are now commonly kept; and the same of all other bestial.

Those who resolve to breed horses, should provide mares of good shapes and other good properties; and the stallion should be the best that can be had. The brood seldom fails to resemble either the sire or dam; and a foal of a good kind requires no more expence in up-bringing than the worst: Therefore whatever the best can be sold at more than the worst, so much is the profit increased. Mares should be served only once in two years; for a mare that is suckling a foal cannot be in good condition to breed one in her belly at the same time; and the mare herself, and the foal in her belly, are both much weakened; and the foal that is brought up on her when with foal at the time, is always much weaker than that which

which is brought up on her, when not with foal. And therefore if you would have the mare and foal to thrive, this rule should be observed.*

I shall not repeat what I said concerning oxen and cows in chap. iii. only I must recommend this principle which cannot be enough inculcated, to keep no greater number than the ground can sufficiently maintain; and rather to abate three or four of the number than keep one more than enough. What is it that makes cattle in other places taller and stronger than they are commonly in this country: But because they are fed more plentifully. Feeding well when young, is a very great mean for strengthening of cattle; therefore the calves should have milk in abundance.†

I come now to speak of sheep, an animal whose universal use is so well known, that it is needless to speak in its commendation: For as it is the most useful, so it is likewise the most beneficial stock to the farmer; for not only as they multiply faster than other cattle, in coming near to their full stature in a year's time; but also their flesh is as wholesome and delicious food as any other: And besides, they every year yield their fleeces, which in some respects is the most considerable advantage; for tho' without them we might be supplied in food, I know not how otherways we could be provided in cloathing.

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* See an estimate of the expence of breeding horses. Vol. I. page 321.

† The author here proceeds to give some instructions concerning the making of butter and cheese. But as he acknowledges, he knows but little of the matter himself, and what he says, is only from the information of others who seem not to have known that part of country business, so well as is now generally known to every country good-wife; I thought it unnecessary to swell this abstract with it. See Vol. I. p. 382.

I shall suppose a farmer to possess a farm of a certain extent; and, as in the case of arable farms, I shall first enquire into the profit made of it in the present method of management, and then what profit may be made by taking another course. We need not be nice about the exact bounds or rent of the farm, these being supposed alike in both cases: All that is made by following the new method more than was formerly is clear profit, providing the charge of servants, and other expences, are alike.

Now, suppose this farm shall contain a mile of ground square, which is about 800 acres, where the ground lyes level; but as the most of sheep pastures are hilly and mountainous, the same circumference will contain more: Let us therefore suppose it to contain 1000 acres, on which we shall reckon 4000 sheep are kept, and 40 or 50 cows besides; but the profit of these I shall not now reckon, having considered that already: Of these 4000 I suppose 2000 of them to be ewes, reckoning those of a year old into the number, from which 1600 or 1700 lambs may be produced every year, the one half males, the other females: 200 of which he may sell at twelve shillings Scots each, which makes L. 120. I admit that a 100 or 150 may die in the gelding and otherwise, when they are young; so that at Hallow-day, there may remain 1400: Now, as in most places, not only the lambs, but the old sheep are fed on very bare pasture, but the lambs are weaned before they are a month or six weeks old, whereby they are kept in a very lean condition; and winter approaching, the natural growth of grass failing, and no other pasture provided for them in winter, but that whereon they fed in summer; we may judge how they can subsist, especially in storms of frost and snow, when for a month together, or perhaps

longer, the fields and hills are totally covered : It is rare to see a stock of sheep kept after this manner, but a sixth part of them dies every winter ; but I shall suppose only 400 to be lost, which is not a tenth part. Before winter, 1000 of the sheep are sold at three shillings sterling a piece ; *Inde* L. 1800 0 0

The wooll of the whole 4000 sheep and 1400 lambs may be reckoned over-head at a pound weight each ; but call it 345 stone, which is a little more, which cannot be valued at above L. 6 the stone ; *Inde* 2070 0 0
To which add the price of the 200 lambs fold 120 0 0

Total L. 3990 0 0

What other profits may be made upon this farm from ewes milk, or from the other cattle, I pass over, and shall allow it to go to defray the expence of tar and greafe for the sheep, servants wages, &c. And if that shall not be sufficient, I shall do the same in stating the produce of this farm in the way I propose it should be kept ; so as the one may ballance the other.

. Now, upon this same farm, in place of 4000, I propose only 2500 sheep to be kept ; and their increase I shall reckon proportionally with the former ; though as they have near double the pasture, they will certainly be in better condition, and consequently more fruitful. However, taking it so, if 4000 yielded an increase of 1700, then 2500 will yield 1062, or a round 1000, discounting the odds for Lambs that may die young. The stock then is 2500 sheep and 1000 Lambs. For these I would have huts built ;
and

and so large that they may have sufficient room to lye at ease and have room to breathe; for too much heat may hurt them; and to prevent that, little holes or windows should be made in the walls. This will preserve them from rain, and save their dung, which is a very great benefit.

The ground I propose should be ordered thus. Two hundred acres of the pasture should be inclosed, and hained till after Hallowday. Thirty acres to be laid up in meadow for hay. And one hundred and twenty to be appropriated for crofting or corn land.

The last will be reckoned the most difficult; but if it is so mountainous that it cannot be plowed at all, it may be made very fertile, and there are few farms of that extent but may afford one or two hundred acres that may be made arable. As the sheep are to be put in cotts every night during the winter, and in summer too, if they are not folded, they ought to be well bedded and littered, which must by no means be neglected, and every one of them will make a cart-load of dung in the year, which I value at fourteen shillings Scots the load: This is 3500 cart loads, which will sufficiently dung thirty-five acres at 100 loads per acre. But seeing the ground is naturally cold, I shall allow six score to each acre, which is as good as nine score of common dung; and the above quantity will serve thirty acres, the strength of which will remain good for four years; So that in four years time the whole 120 acres is gone over with dung. But if this should not be reckoned sufficient, let the dung of the other cattle, that is a dozen horses or oxen that perform the labour, and forty or fifty nolt be added: And notwithstanding this extraordinary dunging, I shall not reckon the produce to be

be more than seven bolls per acre, that is, in bolls,

840

A hundred bolls will serve for seed accord-

ing to what is before observed, p. 476. 100

Horfe corn according to the former calculation 48

Meat and wages to six men kept for labouring
the ground. 100

Let L. 200 be allowed for shearers wages,

This converted into bolls. 40

288

There remains bolls 552

Which being reckoned at L. 5 per boll is L. 2760

I charge nothing for the other servants needed to manage
the other parts of the farm, having omitted it in the
former case; so the one is balanced by the other.

The thirty acres appropriated for meadow or hay, is to
preserve the sheep in storms and cases of extreme neces-
sity when the ground is covered with snow; but if there
is no natural meadow on the farm, is by sowing as many
acres of the corn ground with clover and grafs-seeds, which
is to be done about eight days after the corn is sown, and
the ground made as smooth as possible, and harrow
it in with your harrows filled with thorns, to pre-
vent the teeth of the harrows from going into the ground,
least thereby the mould be raised too high above the grafs-
seeds, so as to bury them; whereas if the thorns are tied
regularly in, it will smooth a thin mould over the seed.
So that year you have your crop of corn, as if nothing else
was upon the ground; and next year, the clover and
grafs will grow up plentifully, and may be mowed two or
three times. I need not here show how much hay may be
made on each acre, or how many sheep may eat a stone of
hay in a day; for I think it will not be questioned that
the

the quantity of hay that will be made will serve this stock of sheep in cases of urgent necessity. But if the ground is so mountainous, that it cannot be plowed to answer the purpose of corn land, it may nevertheless be made into hay, by laying dung upon the grass, or folding the sheep or other cattle on the place intended; and when it is well puddled and dunged by the feet and dung of the bestial, sow it with grass-seeds and harrow it as before directed.

This hay should be placed before them in racks, for if it is thrown upon the ground, a great part of it will be lost by their trampling it among their dung. Some place their racks in the middle of the sheep cotts; but this I discommend; for if the racks are placed so low, that the sheep can eat conveniently out of them, then the wool is torn off their backs, by going through below them. I judge it most convenient to have them placed upon the wall.

The field of two hundred acres that was appointed to be hained all summer, is not to be touched till November, when the sheep are to be put upon it, or sooner perhaps if the other pastures are bare: And by thus prudently providing food for the sheep in winter, they will be much stronger and more healthy than those kept, as was formerly supposed; and consequently their lambs will be fatter and larger; for how can it be thought, that a ewe, lying all winter among frost and snow at the point of starving, can in the spring bring forth a lamb in good condition; we may therefore reckon them a third better than those kept as formerly.

Their wool will likewise be as much improved as themselves. When other beasts are fat and in a good condition, their hair is visibly much softer and smoother. Observe, what difference there is in the hair of a horse that is well
fed

fed and kept, and that of a horse that is fore wrought and ill fed; and so of all other beasts: And as wool is the hair of this animal, why should it not improve by good keeping as much as that of others. I doubt not, if sheep were fed as plentifully in this country as elsewhere, but the wool might be equally good and fine, and the produce as great.

Now, let us see what the produce of this stock may be. The produce of corn is reckoned worth L. 2760

A thousand lambs were supposed to be produced every year, besides those dying young,

100 may be sold in April or May, at 18

shillings a-piece, is

L. 90

400 of the oldest and weakest sheep may be

sold at Hallowday at L. 2 each, is

800

400 should be kept upon the best hained grafs, which may be sold betwixt Candle-

mas and May at L. 4 each, is

1600

This wool of the whole sheep and lambs, was formerly reckoned a pound weight each over head; now it may be reckoned a quarter of a pound more, that is 4375 lb. of wool, or 273 stons, some odd pounds, reckoning this at L. 9 per stone, is

2457

— 4947

Total produce.

L. 7707

The produce of this farm under the former management, as on p. 574.

3990

Difference in favour of the improved

Scheme of management.

— 3717

[To be continued in some future NUMBER.]

A R T I.

A R T I C L E LXVIII.

*Reflections upon the great Advantages of EXPERIENCE to
a FARMER.*

[In a Letter to the PUBLISHER.]

IF the following thoughts can be of any service to your publication, though they do not perhaps tend directly to teach any particular part of Farming, you are very welcome to use them.

Experience without doubt is the best teacher; but it would require an uncommon exertion of the logical powers, to deduce from this axiom, that our agriculture is incapable of improvement from the reciprocal communications of the observations made and still making by the practical farmers, since every system of it, however complete, hath taken its rise in this very way: Yet many seem to think themselves exceeding wise, when they bawl out this as the most natural consequence that can flow from a first principle. None, I dare say, would scruple to give the preference to that knowledge which he acquires by his own particular study and application, since in proportion to the difficulty of acquiring it, it is rivetted upon his mind, and is always the more ready when necessary to call it forth to action: But who would be so self-conceited, as to bar his mind against the entry of every other piece of knowledge, because perhaps it was discovered by some other person, or that, in passing thro' the press, it has assumed the air of Speculative.

A practical Farmer, however much inclined to trudge on in the old beaten path in which his father trode, will lend a greedy ear to conversation, and be even ready to adopt whatever plan of management he can find preferable to his own, when taught him in a plain sensible manner; and yet
will

will be much averse to read the most rational account of an experiment, when committed to paper. I must indeed allow, that, besides the want of a glass, which commonly accompanies the last mentioned mode of communication, there are some other circumstances peculiarly unfavourable to it. Objections cannot be so quickly answered: Hence the pleasing succession of knowledge which attends conversation, is almost lost in this. Anonymous writers too may be careless in making experiments; and though they are not, how is the farmer to rely upon what they say as genuine, when not acquainted with their characters as farmers: Add to all this, the unseasonableness of reading for a plodding farmer, having but just finished the toilsome labours of the day. Who, think you, in this situation then, could submit to such a task, as the reading your SCOTS FARMER must be, to one who would not even swallow the most salutary counsel of a friend, unless administered in a bottle of Two-penny or brown October? Delightful potion! would he say, who would not submit to the lowest drudgery of the field, to be able to relish thy cooling draughts? Thus far, however Mr Printer, the objections against printed instructions are but frivolous; but there are others of a more serious nature, and which it is the business of this letter as far as possible to remove.

The vast number of books upon Agriculture already issued out, under the pompous titles of *A Compleat Body of Agriculture*, &c. were at first bought with much keenness, and read with a degree of attention peculiar to those who would willingly improve by such assistants: But their plagiarist authors knowing nothing of the subject themselves, having made a very injudicious choice of materials from other books, where but scanty gleanings could be got, so bewildered and perplexed the understanding of their readers, that

they

they soon gave general disgust at every thing which had but the appearance of their pretended instruction. Many treatises of agriculture have of consequence been spurned from the indiscriminating multitude (for whose purpose your pamphlet was chiefly intended), with that contempt which they thought they so richly deserved : I shall endeavour, in the sequel of this letter, to show the absurdity of maintaining these prejudices against all opposition.

No man can acquire, of himself, that degree of knowledge, even thro' a long life-time, which he can do by comparing the different practices of the country in general, with their various success : It is certain he cannot trust implicitly to the result of his own experiments, when he finds it contradicted by the general experience of the country. Experience, owing to hidden causes, or the inattention of the enquirer, will oft seem actually to declare things inconsistent with one another, with herself, or the language she speaks universally to the world ; and who could pretend to that wisdom and sagacity that is necessary in making experiments, and discovering upon the first trial the genuine result of them ? How often will he be ready to assert, with experience in some instances, that the wetter his pease-land at seed-time the more certain is the farmer of a crop of pease ; and in another instance, that the steering of the bear-land is an unnecessary practice, since even by different trials, perhaps he knows it for certain, that the unsteered carries better crops, when it is no more but some accidental rain, at an unfavourable season for the barley, which was the cause of it. I shall add but one other instance more : How often would he be ready to assert, in consequence of a few years observation, that it is altogether unnecessary to pickle wheat in order to prevent the black with which it is often infested ; tho' the general experience of the country can declare this a manifest error :

Hardly will the experience of twelve or twenty years convince some of the necessity of applying this remedy; though having it but once in any of these times will be more loss, than the expence of pickling through a very long tack. Since then, from the variety of circumstances to be considered, and the comparisons to be made in discovering the genuine result of experiments, the mind is ready to be perplexed, and to draw false conclusions; since it is impossible for any person to acquire that knowledge by himself, which he can by the assistance of his neighbours; it appears of consequence to have clubs established, and periodical papers circulate, for the benefit of the Farmer and of his country.

East Lothian,
Sept. 26. 1774.

I am, SIR,

Yours, &c.

A R A T O R.

A R T I C L E LXIX.

The Effects of ELDER, in preserving Growing Plants from Flies and Insects.

[In a Letter from CHRISTOPHER GULLET, Esq; of Tavistock, in Devonshire, to Dr MATY, Secretary to the Royal Society.]

S I R,

I Should not presume to trouble you, as a member of the Royal Society, with the following letter, did not the subject seem to promise to be of great public utility. It relates to the effects of Elder;

Sambucus fructu in umbrellæ nigro.

1st, In preserving cabbage plants from being eaten or damaged by caterpillars.

2nd, In preventing blights, and their effects on fruit and other trees.

3d, In

3d, In the preservation of crops of wheat from the yellows, and other destructive insects.

4th, Also in saving crops of turnips from insects, &c.

1st, I was led to my first experiments, by considering how disagreeable and offensive to our olfactory nerves the effluvia emitted by a bush of green Elder leaves are; and from thence reasoning how much more so they must be to those of a butterfly, whom I considered as being as much superior to us in delicacy, as inferior in size. Accordingly I took some twigs of the young Elder, and with them whipt the cabbage plants well, but so gently as not to hurt them, just as the butter flies first appeared; from which time for these two summers, tho' the butterflies would hover and flutter round them like gnomes and sylphs, yet I could never see one pitch, nor was there I believe a single caterpillar blown, after the plants were so whipt; though an adjoining bed was infested as usual.

2d, Reflecting on the effects above-mentioned, and considering blights as chiefly and generally occasioned by small flies, and minute insects, whose organs are proportionably finer than the former, I whipt the limbs of a wall plumb-tree, as high as I could reach; the leaves of which were preserved green, flourishing, and unhurt, whilst those not six inches higher, and from thence upwards, were blighted, shrivelled up, and full of worms. Some of these last I afterwards restored, by whipping with Elder, and tying it up among them. It must be noted, that this tree was in full blossom at the time of whipping, which was much too late, as it should have been done once or twice before the blossom appeared. But I conclude, from the whole, if an infusion of Elder was made in a tub of water, so that the water might be strongly impregnated therewith, and then sprinkled over the tree, by a hand engine, once every week or fortnight, it would effectually answer every purpose that could be wished, without any possible risk of hurting the blossoms or fruit.

3d, What

3d, What the farmers call the **Yellows** in wheat, and which they consider as a kind of mildew, is in fact (as I have no doubt you well know) occasioned by a small yellow fly with blue wings, about the size of a gnat. This blows in the ear of the corn, and produces a worm, almost invisible to the naked eye; but being seen through a pocket microscope, it appears a large yellow maggot, of the colour and gloss of amber, and is so prolifick, that I last week distinctly counted forty-one living yellow maggots or insects in the husk of one single grain of wheat; a number sufficient to destroy and eat up the corn in a whole ear. I intended to have tried the following experiment sooner, but the dry hot weather bringing on the corn faster than was expected, it was got, and getting into fine blossoms, ere I had an opportunity of ordering as I did; but however, the next morning at day-break, two servants took two bushes of Elder, and went one on each side of the ridge, from end to end, and so back again, drawing the Elder over the ears of corn of such fields as were not too far advanced in blossoming. I conceived, that the disagreeable effluvia of the Elder would effectually prevent these flies from pitching their tents in so noxious a situation; nor was I disappointed, for I am firmly persuaded, that no flies pitched or blowed on the corn after it had been so struck.—But I had the mortification of observing the flies (the evening before it was struck) already on the corn, (six, seven, or eight on a single ear) so that what damage had accrued, was done before the operation took place; for, on examining it last week, I found the corn which had been struck pretty free of the yellows; very much more so than what was not struck. I have therefore no doubt but that, had the operation been performed sooner, the corn would have remained totally clear and untouched.

If

If so, fimple as the process is, I flatter myself it bids fair to preserve fine crops of corn from destruction, as the small insects are the crop's greatest enemy. One of those yellow flies laid at least eight or ten eggs, of an oblong shape, on my thumb, only while carrying by the wing across three or four ridges, as appeared on viewing it with a pocket microscope.

4th, Crops of turnips are frequently destroyed, when young, by being bitten by some insects, either flies or fleas: This I flatter myself may be effectually prevented, by having an Elder bush spread so as to cover about the breadth of a ridge, and drawn once forward and backward by a man over the young turnips. I am confirmed in this idea, by having struck an Elder bush over a bed of young collyflower plants, which had begun to be bitten, and would otherwise have been destroyed by those insects; but after that operation it remained untouched.

In support of my opinion, I beg leave to mention the following fact from very credible information, That about eight or nine years ago this county was so infested with cock-chaffers, or oakwebs, that in many parishes they eat every green thing, but Elder; nor left a green leaf untouched besides Elder bushes, which alone remained green and unhurt, amid the general devastation of so voracious a multitude. On reflecting on these several circumstances, a thought suggested itself to me, whether an Elder, now esteemed noxious and offensive, may not be one day seen planted with, and entwisting its branches among fruit trees, in order to preserve the fruit from destruction by insects; and whether the same means which produced these several effects, may not be extended to a great variety of other cases, in the preservation of the vegetable kingdom.

The dwarf Elder (*ebulus*) I apprehend emits more offensive effluvia than common Elder, therefore it must be preferable to it in the several experiments.

A R T I-

ARTICLE LXX.

Useful Hints, Observations, &c. relating to AGRICULTURE; And some of the Mineral and Vegetable Productions of this ISLAND.

THERE are few things that could be made clearer, if we depended only on authority, than that there have been many rich silver mines in England; since we have not only credible histories, but authentic records also which attest the fact. Yet, if we admit these, we must take this term in a general sense, for mines affording silver, and not in the usual restrained signification of mines producing silver ore. This ambiguity was introduced by the state of our constitution in former times; for then all mines holding either gold or silver, which might be extracted to profit, were allowed to be mines royal, and passed in a common, or rather in a legal acceptation, for gold or silver mines. It was in consequence of this, and of the methods taken to support the prerogative of the Crown, that our mines were so indifferently known and so little wrought, as, by the removing of these impediments, they have been within less than a century so much improved; so that at this time we have actually more silver extracted from our lead than ever, though we hear nothing more of silver mines. It is, however, indisputably true, that some pieces of pure silver are now and then found in our copper, lead, and tin mines. But, notwithstanding this, and the superior skill of our artists in assaying, we have not hitherto discovered any such thing as silver ore, which is what properly constitutes a silver mine. But this by no means proves there are none in the island, or ought to discourage a search for them.

The wise Lord Verulam exceedingly regretted the exportation of lead and of lead ore to foreign parts, or even its being consumed at home, without extracting the silver; and with too much reason. In his time the annual produce
of

of our lead mines was eight thousand tons, which, at the moderate computation of twenty ounces in a ton, would, in the space of a century, even supposing we had raised no more than we then did, have supplied us with four millions of our own specie.

Might not charred turf, or Dutch turf, that is made and dried as the Dutch turf is, supply, where neither can be had, the place of wood or coal? Dutch turf has been used by silver-smiths here. Would not culm, mixed in the making Dutch turf, produce a strong fire? Has the charring pit-coal been properly attended to, or its effects sufficiently examined?

Not above two centuries ago, it is worthy of remark, some of the wisest men in the kingdom doubted the possibility of rendering this island so fertile in corn, as not to be in a continual state of dependence in this respect on its neighbours. On this principle, they opposed laws for promoting agriculture, as oppressive and vexatious to the people, as directing their views to an object which their utmost industry could never attain.

Agriculture is the great support of the nation, in which every individual is interested, for the most material articles of his daily subsistence in food and in drink: in this respect all manufactures depend upon it; from its produce it is the chief stay of the landed interest; it contributes largely to navigation and commerce, in various ways; and taking all these together, to a vast amount towards the maintainance of government. All these benefits, important as they are, become exceedingly more so, from the consideration that they are stable and permanent, the work of prudence and perseverance, and which can never decline but through indolence and folly.

The French now very wisely and successfully practise a
husban-

husbandry which they learned from us. They split the ridges of wheat-stubble, and sow it with rye, which in April and May they cut for their black cattle (whereas we feed sheep and lambs); and if the weather proves favourable, they mow it three times, which at that season is highly beneficial.

Experience is the Farmer's only guide, and yet he can seldom spare time or money to make experiments: The Society of Arts, Manufactures, &c. by their premiums, have removed, at least in a great measure, this difficulty; in doing this they have done more than was ever done towards promoting the progress of agriculture, and thereby merit highly of their country.

There is a wide difference between an improvement's being known and published, and its coming into general use; in respect to which a history of British husbandry would be of great utility.

The trials made by Dr Hill in regard to the Norway turnip, which grows to a large size on hillocks raised on bogs, deserve attention. This, though of no great consequence in a fertile country, may be found of great utility in moors and morasses, till they fall into the hands of such as can afford to drain and cultivate them in a better manner. All experiments of this nature ought to be made as much known as possible.

The Romans boiled and eat the green leaves of turnips, as has also been done by our peasants in hard frosts. In times of scarcity they formerly boiled turnips, and after pressing, kneaded them, with an equal quantity of wheat flour, into what was called turnip bread. The many uses to which they are applied in medicine are well known, and strongly supported by experience. This root, from what has been discovered of it, furnishes an admirable precedent for future improvements.

THE
SCOTS FARMER,

NOVEMBER 1774.

ARTICLE. LXXI.

FARMERS KALENDAR.

Farm-Yard.

THIS month you begin to experience the conduct of the farm-yard, on the principles already laid down. Observe now to keep all your cattle confined: let none of them wander about the fields, where they can get nothing to eat; but, if it proves wet weather, will do much mischief by poaching. Litter all the yards completely from your stacks of straw, stubble or fern: so that, be the season ever so wet, the cattle may not tread into the layer or bottom of marle or earth, nor ever lie wet. As fast as the litter is trodden into dung, or becomes quite wet, cut fresh slices down from your stacks, and spread it about. Have an eye to the horse-keepers, that they use plenty of litter; also that your fasting-stalls, cow-houses, ox-houses, hog-fries, &c. be all kept quite clean littered; for this is the best and cheapest way of raising manure.

If your head-lands or head-rigs are too high, which is frequently the case from the Plough turning upon them; or if the sides of the fields are over-grown with rubbish, such as thorns, brambles, thistles, and other trumpery; all such rubbish, when the hedges and ditches are first repaired,

paired, should be grubbed up root and branch, and the earth from the top of the head-lands, dug as many spits deep as necessary to lay the whole on a slope for the field, so that the water from the water-furrows may every where have a fall to go off, either into the ditch, if on that side, or quite to the bank of the hedge, if on the other. The earth, thus dug up, should be laid into a high ridge along with the scourings of the ditches, ready for carting; and the best use that can be made of it, is to carry it into the farm-yard, at the proper season, to form the layer now recommended: But if the distance is too great for this use, then it is a good way to mix it up with lime, and spread it on the nearest grass field. Lime certainly has a great use in mixtures of this sort; for it dissolves all the numerous little roots and fibres, of which this earth is full, and prepares them for becoming manure: it also takes off that sourness, which is found in fresh earth of any depth, it likewise pulverises in a surprising manner. If enough of it is laid on with such earth as this, it will unite with every particle of it, and raise such a fermentation, that the whole mass shall be found like running sand, and in fine order for spreading even on grass-land, where it will be very beneficial. By this piece of good husbandry, you effect several excellent purposes: you gain some land, you drain the fields, and also manure them. The whole is a system of neatness and profit, and such as no good farmer should ever omit.

Threshing.

As Soon as the cattle are taken into the yards, the threshers must be set to work, to supply the lean beasts with straw, and they must be kept close and regularly to it; and you should observe well, that your stock of cattle be proportioned to the quantity of your straw, that they may be carried through the winter on it; consequently the

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the number of threshers must be appointed upon the same plan; but this exactness is not requisite, if you are so situated as to have a command of straw at all times, when you want to buy it.

Fences.

This is the first month for hedging and ditching: October is too soon. After you have once brought your fences into good order, which should always be effected within the three first years of a lease; the best way is, to divide the length of hedging into twelve parts, and to make it a rule to do one twelfth every year afterwards; by which means the whole will always be kept in good order. The best method is the plashing, in which so much of the hedge is made of live wood, that it holds up and lasts far longer than hedges made all of dead wood, which is the practice of some countries; but they are rotten, broken down, and gone, before the quick wood gets up to form a fence; whereas, in the plashing method, by leaving as many hedge stakes alive as possible, and by laying down much growing wood, the fence is constantly impenetrable.

The article of hedging and ditching is too much slighted by most farmers, who do no more than they are bound to by their leases, and, were it not for that tie, would do none; but the utility, and even profit (if avoiding loss may be called profit) of having all the fences in such good order, as to be depended on for securing the crops, is very great. There is not a more troublesome, and in many cases a more expensive conduct, than suffering cattle, for want of good fences, to break into one's own, or others crops of corn, hay, turnips, &c. The farmer, who is not secure of his fences, never knows where to find his cattle.

cattle. Let therefore the industrious husbandman, who would carry on his business with any commendable spirit, take good care to allot money enough to this object, when he hires his farm, that he may be able to get his fences into good order within the three first years of his lease: and, in this work, let him dig deep and wide ditches, which add prodigiously to the strength of the hedge. However well the hedges of a farm may be made, still they are easily passed and damaged, if not defended by a ditch. Another great use of them is to serve as main drains about a farm: they cut through the springs, and are so many courses for all external water, draining land greatly, if there are no hollow drains made; but, if such are executed, then the ditches are of excellent use to direct them into, that the water may be carried clean off the farm, without the expence of making large drains on purpose.

Folding.

In case this month proves wet, you must leave off folding the arable lands, and begin with the dry grass fields. The farmers in general stop about this time for the whole winter: but that is very bad management: their idea, that winter folding is of but little use, is totally a mistake, as the easiest experiments every day to be made will fully evince. Winter is the proper season for manuring grass-lands, which you could not fold in summer, had you ever so many sheep; nor does winter-folding, on very dry grass-land, do any harm to the sheep, as many gentlemen with very fine flocks have fully experienced. The benefit to the land is so great, that it is surprising more common farmers do not practise it; the moss, that great enemy to natural pastures, is completely destroyed by it, and such a luxuriance of grass succeeds, that the most ample manuring,

manuring, by any other way, will not equal. You may manure mossy ground often, before you destroy it; but the treading of the sheep, at the same time that the dung and urine are dropt, completely destroys it; and this manuring is more adapted to turf, than any dung to be spread on the surface, which is always troublesome to get in.

The Teams.

This is an idle month for the teams in many farms; but should not be with good husbandmen: for, as I have often remarked, they must be constantly well fed, and employed, or less will be the consequence. There are many works that may be executed in this month: on light dry soils, the marle, chalk, or clay carts should not stop; they may work from the first day till the last. In wetter soils, you may cart any sort of manure on to grass lands, provided you use small carts with nine-inch wheels; the great utility of which is the opportunity of carting on grass-land through all the winter without poaching.

And, in case of no work of this sort, then the teams should be constantly employed in bringing purchased manure from the nearest towns; which work will receive no interruption from the carrying out of products, as manure may be brought back, instead of coming home empty. All sorts should be purchased that can, such as horse-dung, cow-dung, hog-dung, pigeons and poultry dung, coal-ashes, foot, malt-dust, lime, carriers shavings, tanners bark, hair, and lime, &c. &c. and whatever others can be had: all should be thrown into one heap, and mixed together, before they are spread on the land. This husbandry will pay a farmer extremely well; but it is too much neglected by most of them.

Draining.

Draining.

In this month you may begin the work of hollow draining, which, on wet lands, is the *sine qua non* of husbandry. It is in vain to think of farming them to any profit, without this improvement. Manuring, before this is done, is but expending money for five *per cent.* advantage, where fifty ought to be the return. Lay your land dry before you attempt other improvements : the first step is cutting deep and large ditches around the wet fields ; then you gain a requisite fall to take the water clean away from the drains. It is highly necessary, if your soil is such as to allow it, to cut the small drains with a draining plough, of which two or three are invented, and now easily to be had. The difference in the expence between plowing and digging them is very great : they may be plowed for a fifth of the cost. If you have any quantity of land to drain, it is therefore very adviseable to provide one of these ploughs. If the soil is very wet, it will be necessary to cut the drains pretty near each other ; for instance, about a perch, a perch and a half, or two perches asunder : by which means it will be laid in most dry and wholesome order. Fill them with whatever materials you can get the easiest, bush faggots, stones, bricks, &c. &c. No improvement in agriculture is greater than what is effected by these drains, nor any that will sooner repay the expences. In many parts it is well known, that the first arable crop will repay the whole expence, which is a profit not be reaped in any other article, to which a man can attend.

Water Meadows.

In this month you may begin to water your meadows and pastures, wherever it can be done ; and be assured, that no improvement will pay better : a winter's watering
will

will answer in the hay, fully equal to a common manuring of the best stuff you can lay on the land ; and the expence in some situations, is nothing, in others very trifling. The lower parts of a farm are generally in grafs; the farmer should attend to his ditches, so that the water, from all the higher parts of the farm, may have an unobstructed course to a ditch a little above the bottom, from which it may be let at pleasure over the meadows, observing that it only runs over them. and does not stagnate. All this is in numerous farms to be effected with very little trouble or expence, and yet thousands of farmers never take any heed of such advantages ; but, on the contrary, many of them are at an expence to deepen ditches, merely to carry away the water, and prevent its floating any of the grafs. Such ideas are all the result of the antipathy, which the common farmers have to experiments: they hate to try the effect of any thing out of the common road ; would much rather be at an extraordinary expence, in pursuing the beaten path, than jog an inch out of their way, though to save hundreds.

Walling.

In the dry stony countries, walls are the common fence ; and when well made are impenetrable, and extremely durable. This is the proper season to begin building them ; they are made of whatever stone is most plentiful. It is the peculiar happiness of such tracts in the circumstance of those stones which are of prejudice on the land, being convertible, not only into fences, but also houses, barns, and all other offices. If the stones are very unequal in size, and not easily cut, which is the case with whin-stones, it will be necessary to build the walls wider at bottom than at top, gradually diminishing till it comes to a mere edge ; but grit-stone, or free-stone, cuts with so much ease, that
you

you may build walls of it without mortar, as true as with it; and if well laid, they will last as long. In the inclosing of wastes, it is proper, by all means, to begin the walling in this month, and continue the work all winter. In all countries, where walls are the common fence, there is a fixed price per perch for the whole work. In these undertakings, it is always proper to proportion the size of the inclosures, to the stoneyness of the land; for when the stones are pretty thick on the surface, they must be all removed before it can be cultivated. The building should be fixed in the most stoney part, near the center of the new inclosures, and, the walling being traced through those parts that are most stoney, the whole land may be quite cleared of these enemies, and all be applied to a most convenient use.

But it should here be observed, that the generality of wall inclosures are very deficient in one circumstance, pardonable in the undertakings of a farmer, but not to be excused in those of a gentleman: it is, the trusting solely to walls, and never planting white thorns. The wall should never be esteemed as any thing but a temporary fence, not from a want of durability, but shelter: Walled inclosures are generally made in high, open, bleak situations, where shelter is as much wanted as inclosure: walls shelter very poorly, the wind either driving through them, or reverberating and cutting the cattle with a borrowed keenness. Hence let the inclosers of wastes determine on the small extra-expence of planting quick-hedges against all their walls, that hereafter the fields may be more protected from the cold winds, than they can be by means of walls alone. But, if it does not suit them to follow this plan with all the subdivisions, at least let them double-wall the outside fence, and, leaving a space a few
perches

perches wide between, plant it thick with whatever trees suit the soil best. Spruce firs are in general to be preferred in bleak situations ; because they yield a better defence against the wind than most other sorts.

Dig Manures.

All this month the carts should be employed in carrying marle, chalk, clay, or ditch-earth, upon soils that are light enough to admit carting on through winter. On large farms in sandy countries, that are hired with a view to such improvements, it is a very favourable circumstance, that you are not obliged to stop such works, because of winter ; but, in richer soils, proper management will remedy this evil. The manure should be laid on old clover-lays left on purpose, and small three-wheeled carts used, with nine-inch wheels ; by which means you may, without cutting or poaching, cart all winter.

Cut Ant-Hills.

This is the proper season for destroying ant-hills. Many ploughs have been invented for cutting them off level with the surface of the field, ready to be carted away ; and, if that is the way you take with them, such machines are of great use, for they will certainly do the work of many men ; but I think the common method used by the farmers in general is preferable : the men open the ant-hill with three cuts of a sharp spade, skinning the turf, so as to lay the heart bare : they then with another stroke cut out the heart in a round, or rather triangular form, leaving the bottom of the hole, from whence it came, lower than the field. In this manner, they leave it for a month or so, that the rains may collect, and kill all the ants ; after that, they turn down

the grass-turf, which they had skinned off: the heart of the hill, and the pasture, are left as level as ever, without destroying any grass: the lumps of earth that come out must be carted away. This work is done very expeditiously; where, by the great, it costs only from four pence to six pence *per* hundred; at which trifling expence, you get rid of a great evil, and gain in return ten times as much. Many fields are every day to be seen, so over-run with these hills, that they cannot be mown, how well soever it would answer; and yet the slovenly occupiers have not either sense, money, or spirit enough, to cut them up, though so easily done. But let the farmer, who would carry on his business in such a manner, as to render every part of it profitable, and who should always have money enough to execute what they know to be right, conduct himself on other rules, and not take the adage for his guide, *A penny saved is a penny got*; which stupid maxim would send him presently to jail. The pence saved in the omission of draining, of manuring, of water-furrowing, of folding sheep, &c. &c. are all *pence gotten*; and we often see them so saved: but those, who think they are therefore economists, are wretchedly mistaken. The works of a spirited and correct agriculture should never stand still for want of money, which they never would do, if farmers were beaten out of the unprofitable practice of hiring more land than they can effectually manage. Wanting money in husbandry is just as ruinous as in commerce: a merchant would make a fine figure, that had an advantageous opening for exporting a profitable cargo, but lost it, because he could afford neither a ship of his own, nor to freight one of his neighbours: or whose ships lay in port, because he could not afford to pay the sailors wages; or whose books were kept irregularly to save the expence of a clerk: and yet, as extravagant as all this may seem, it is not a

whit

whit more preposterous than letting the teams on a farm stand idle in a stable, because the farmer cannot afford to buy dung for them to bring ;—than plowing, sowing, and harrowing wet land, because he cannot afford to drain it ;—than feeding pastures that ought to be mown, to save the expence of cutting ant-hills ;—than suffering a constant loss in damaged crops, because of the expence of putting the fences into repair. All these articles are instances every day to be met with among farmers, that might, and would act otherwise, had they *less* land; for then they would of course have *more* money. It is highly necessary to attend well to this matter in the hiring of farms; for if more land is taken than the sum of money in a man's possession will allow, he cannot possibly conduct himself by those rules, which he thinks or knows to be right; he cannot even cut his ant-hills for want of money, without some other work of the same class being neglected.

Pease.

Upon dry soils, that plow well in winter, this is a good time to sow the hardy hog-pea, which will remain uninjured by frosts, and be much earlier in the following year, than those sown in the spring. Sow about four or five bushels an acre on the ground, and plow them in, leaving the land without any harrowing; but water-furrow it, unless it be quite a dry land. Upon such soils, this will be a profitable employment for your teams in this idle month.

Sheep.

The lean stock sheep will yet be kept on the remains of the summer-grass, and on the sheep-walks; but the fat stock must now be at turnips or cabbages. Remember that fattening cattle, of whatever sort, should have as much
meat

meat as they like ; but should, at the same time, be prevented from making any waste. Giving fat sheep the turnips or cabbages is a dubious point ; many farmers urging strenuously the necessity of saving carriage, by letting the sheep feed them off where they grow, provided the land is dry enough ; but others, seeing the waste they make, are of a contrary opinion, and carry the turnips to a grass field, where they give them the sheep as they require, and without near so much waste as is made in the other case. Upon these systems I shall remark, that, if the land is sand, or as dry as sand, you may manage to feed off without waste ; because the soil is so clean, that there is no soiling by dirt or poaching ; and, by bringing a stock of lean sheep to eat up the leavings of the fat ones, there will not be the least waste made : but this point of lean stock following the fat ones is too much neglected by many farmers, who only run over their fat sheep, and consequently spoil a large proportion of their crops. The management of sheep fattening on turnips is reckoned, by several farmers, a nice part of husbandry : it is always a matter of consequence to fat cattle, of whatever sort, as fast as possible ; and an expence, something beyond the common amount, is well bestowed, if it accelerates the fattening of the beast ; thus it is good management, in many farmers, to have a sheep-rack filled with hay always in the turnip field, that is fed by fattening sheep : others give them bran or barley-meal, or pollard, or grains, or malt-dust, in troughs ; the dryness of all which, except the grains, are an excellent opposite to the moisture of the turnips, and will contribute well to the more speedy fattening of them. I do not, however, mention these assistants as being absolutely necessary ; because I know that thousands of sheep are fattened on turnips without any such help. Another article of dry food, which agrees excellently

excellently with turnips, is chaff; and if that of the crops be not sufficient, cut it with a box of straw and hay: this makes very good dry meat for sheep that are fattened on turnips or cabbages.

In the winter fatting of sheep, it is worth observation, that the proper time to sell is *April* and *May*; because then mutton sells at least an halfpenny a pound dearer than at any other season. The farmer therefore, who would winter fat to the greatest advantage, must have some food in plenty to come in, when his turnips are gone; for he cannot keep them longer than the end of *March*, to profit: spring corn, sown after turnips that are kept far into *April*, suffers much from late sowing; and as the turnips, even from the beginning of *March*, sprout out very fast, the roots grow hard and flocky, so that fat sheep will eat them but with difficulty. Hence results one of the strong motives for cultivating cabbages, which are in full perfection when turnips are rotten and gone. The great *Scotch* cabbage, and the turnip-cabbage, also the cabbage-turnip, are the sorts principally recommended for this purpose; because they stand the severest frosts without damage, and the quantity they produce *per* acre, especially the *Scotch* cabbage, and the cabbage-turnip, is so great, that no crops of turnips equal them. By means of these plants, you keep your fatting-sheep to plenty of food, of the best kind, quite through the spring to the middle of *May*, and sell them at a time, when few other farmers have any thing for their stock, but the young grass of their meadows and pastures, which they feed to the irreparable damage of their hay crops. This is perhaps the most peculiar use, to which cabbages are applicable: no other root or vegetable rivals them in this particular, if quantity of produce be considered, as well as the season of feeding it. Upon light rich lands, well managed

naged, clover and ray-grafs will yield a good bite by the middle of *April*; but then the farmer muft be particularly attentive to have feveral fields to fucceed each other, as the quantity of food on an acre of ray-grafs, fo early as the middle of *April*, is no great matter : manage how you will, you will not get any five acres of grafs to equal one of cabbages at this pinching feafon. If the farmer was particularly defirous of excelling in this branch of husbandry, I fhould recommend to plant *Scotch* cabbages (from the accounts we have of them) to fucceed turnips, by the middle or latter end of *March*, to take the fat fheep for three weeks, and have a crop of turnip-cabbages to laft them from thence till the middle of *May*. By this conduct, he will never want food for his fat fheep quite through the fpring, without damaging his meadows and pastures, according to the prefent bad cuftom of fo many farmers.

And, in the culture of thefe plants, let the man, who would act in the beft manner for profit, attend well to giving them fair play. Let him not, except on very rich land, omit manuring amply, that he may command large crops, which is of peculiar importance in this cafe, not only in the value of the crop itfelf, but alfo in that which fucceeds; for, if the cabbages are kept eating till the middle of *May*, much of the fpring corn, that follows them, cannot be fown till *May*, which is fo untoward a circumftance, that as great crops of the fheep-food fhould be gained as poffible, to contract the fpace of land fo occupied; every pound weight gained *per* cabbage is a fure gain in the barley that follows, as well from earlier fowing, as from the increafe of dung from the fheep. Thofe, who have experienced the evils of late fowing, will think this a matter of importance.

ARTICLE

ARTICLE LXXII.

Of the Scheme in which Wheat is succeeded by Pease, Barley, and Oats.

[From DICKSON'S AGRICULTURE, Vol. II.]

EVERY person that considers the order of this succession, will immediately observe, that fallowing or sowing grass-seeds, must be a necessary part of this scheme. The wheat is the first in order, and the oats are the last. Should the same crops be repeated in their order without a fallow, then wheat immediately follows oats, which is very improper. We must therefore suppose, that there is a regular fallow in every rotation, or that the order of the crops is changed after the first rotation. The order introduced, depends upon the number intended, and the situation of the land; and the directions on page 551. are sufficient for this.

It is not easy to determine, whether the scheme here mentioned, or the scheme mentioned page 551. is the most proper one. It will not be amiss that we compare them together, that so we may be the better able to judge. The two schemes to be compared together are these: The one, barley after the fallow, succeeded by oats, pease, and wheat; and the other, wheat after the fallow, succeeded by pease, barley, and oats. In both these, the crops are properly arranged. The wheat is separated from the barley and oats by pease on the one side, and fallow on the other. The only difference is, that in the one, the fallow is immediately before the barley and oats; and in the other, it is immediately before the wheat.

If we compare these schemes with respect to the expence of management, we must determine in favours of the first:

first: For, as was hinted on page 554. in this six or seven plowings only are necessary in the rotation; that is, three or four for the wheat, three for the barley, and one for each of the other crops; whereas, in the other scheme, eight or nine are required in the rotation, that is, three or four for the wheat, three for the barley, and one for each of the other two crops. This is certainly well worthy of attention, and, when all other circumstances are equal, should determine the question.

If we compare these schemes, with respect to the situation of the land after the rotation is finished, we find very little difference, or rather that this depends upon the kind of soil. It is certain that land, supposing it to carry equal crops of corn, is exhausted of its vegetable food, in proportion to the number and kinds of weeds that it nourishes along with these crops. It is certain likewise, that when wheat is sown immediately after the fallow, root weeds are most encouraged; and that, when barley is sown after the fallow, seed-weeds are most encouraged. Any of the seed-weeds that spring along with the wheat, are destroyed by the winter-frost, and, in the spring, the surface is, generally speaking, so firm, and if the land is in good order, it is so well covered, that few of the seeds vegetate; or, if they should, are not allowed to come to perfection. Besides the spring-plowings given to the barley, which is in this scheme the third crop after the fallow, is a means of preventing the increase of these weeds. But if there are any root-weeds left in the fallow, these continuing long undisturbed during the wheat crop, in a well prepared soil, are thereby allowed to extend themselves; and the spring-plowings given to the barley-land, though they have some influence in a good season, yet are not so proper to destroy these as seed-weeds.

The

The sowing barley immediately after the fallow, has a contrary effect. The root-weeds supposed to be in the field at the sowing of the wheat, and encouraged by the situation in which the wheat land lies through the winter, are checked by the manner in which the fallow is laid up during the winter for the barley; for it must be remembered, that the fallow for barley, from its situation, is much drier during the winter, than when it is sown with wheat in the autumn; the growth of these weeds are likewise in some degree checked by the spring plowing given to the barley, if the season is good. On the other hand, the situation in which the fallow for barley is put in the autumn, is not so favourable for the springing of seed-weeds, as the situation of the wheat-land when harrowed; so that a smaller quantity are destroyed by the winter frost: But the spring-plowing and harrowing encourage them to grow along with the crop; and though the crop should be very rich, yet some of them will come to perfection; and the land receiving only one plowing for each of the other crops that follow, little or no check is given to their increase. From these things then, it seems to follow, that the sowing barley immediately after the fallow, has the advantage in land inclined to root-weeds, and that the sowing wheat immediately after the fallow, has the advantage in land inclined to seed-weeds. It is uncertain, whether or no the two additional plowings, given in the one scheme more than in the other, have any influence upon the situation of the land, when the rotation is completed. It is probable, that at the first plowing of the fallow, some difference may be found, that the fallow after the oats is easier plowed, than the fallow after the wheat; but this difference is probably made up by the situation in which the fallow for barley is laid during the winter, before it is sown.

In comparing these two schemes, we have supposed, that the crops produced in a rotation of each, are of equal value; but it is probable, that there may be something in the difference of soils, to make the one scheme better adapted to one kind of soil, and the other scheme better adapted to another kind; and consequently that better crops may be expected, when the schemes are thus adapted to the soils, than when otherwise. An inquiry into this will not be thought improper.

It has already been observed, with respect to these schemes, that the one encourages one kind of weeds, and the other another kind: It is certain, that as weeds exhaust land of its vegetable food so in proportion to this they lessen the crops. It is probable then, that that scheme succeeds best, which is best adapted to discourage the weeds to which the land, on which it is fallowed, is most liable.

It has been observed likewise, that in agriculture much depends upon performing the different operations required, when the land is in a proper situation for receiving them. Every farmer expects a good crop, when he has had a good season for plowing and sowing. On the other hand, he fears a bad one, when he is obliged to plow or sow when the land is in a bad situation. One of the schemes mentioned requires more plowings at certain seasons than the other. When wheat is sown upon the fallow, the barley-land must be plowed in winter. When barley is sown upon the fallow, there is no necessity for this. All kinds of land receive much less benefit from plowing when they are wet, than when dry; and all wet lands, particularly the clays, are in that situation during the winter season; and therefore the scheme of management that requires the less frequent plowings in that season, will probably be most successful. In this I have the barley-land particularly in view, as the barley is a more tender plant, than either the

oat

oat or pea, and needs more culture. When barley is sown upon the fallow, both the barley and wheat lands are plowed in a season, when there is the greatest reason to expect, that they will be in proper order. The fallow is plowed in summer, in the time of harvest, or immediately after : It may be laid up before winter, in such a way as best to defend it against the rain ; and as soon as it is in a proper condition in the spring, may receive the seed-furrow, or the seed may be sown upon the winter furrow. Besides, as dung is laid upon the fallow, if this is done either in autumn, or in the time of the winter frost, the soil is thereby mellowed, and in a proper condition for receiving the seed-furrow, if necessary, when the spring drought sets in. As in this scheme, the wheat is sown after pease, the wheat-land, unless the harvest is very late, or the winter rains set in very early, is always in a proper condition when plowed. But when wheat is sown upon the fallow, if the land is naturally wet, the barley-land must either be deprived of the spring plowing, or is in danger of receiving it in bad order, by either of which the crop must be lessened.

When the land is dry, there are no such disadvantages in sowing wheat upon the fallow, as the season is seldom or never so bad, as to prevent the barley-land from receiving all its plowings in proper order. In this kind of land then, especially if there is any thing in the nature of it that disposes it to wheat rather than barley, the wheat may be sown upon the fallow ; but when land is wet, and particularly when it is stiff in its nature, it seems more proper to follow the other scheme, and sow barley.

Sometimes it is observed, that the crop of wheat, upon the fallow, fails, when it is very good after pease. This happens when the soil is well reduced by the fallow, and there are sudden changes from frost to thaw. These changes

ges occasion a fermentation in the soil, which exposes the roots of the plants to be destroyed by the frost-wind, and are sometimes so violent as to throw the plants entirely out of the ground. This is another reason for sowing barley on the fallow, in such soils as are liable to such a violent fermentation.

In comparing these two schemes together, it may be further observed in favours of sowing barley upon the fallow, that when the barley-fallow receives no more furrows than the wheat-fallow, the farmer has it in his power to plow a great part of his oat-land before the wet season comes on, which in wet clay land is a very great advantage.

I shall only add, that, as in sowing wheat upon the fallow, there is one fourth part more plowing than when barley is sown, the farmer, that prosecutes the last scheme, may save a considerable expence in management; or if not, he may employ it in some way that may render it more beneficial.

Of Wheat upon Fallow followed by Oats, Pease and Barley.

It is commonly reckoned very bad husbandry to sow oats after wheat. In the tacks or leases, in which the farmers are restricted in the manner of cropping, this is one of the things that is provided against: And indeed I am persuaded, that it would be found very improper in the ordinary schemes, and tend much to impoverish the land. Both wheat and oats are severe crops, when they follow each other; therefore immediately, without some more favourable crop, or a fallow intervening, it is natural to suppose, that the land on which they are raised will be left in very bad order. However, this practice is found to succeed on some kinds of land in some particular situations. Not only the crop of oats is good, but the pease
that

that follow, and, I need not add, the crop likewise that follows the pease, as a good crop of pease is almost a security for the goodness of the crop that follows, if the land is properly managed.

The kind of land here mentioned is a wet clay, and the particular situation is, when the land is properly cleaned, and well reduced by a fallow.

This kind of land, carefully fallowed and well dunged, seldom fails in producing a good crop of wheat. In the ordinary schemes of management, after fallow-wheat, is sown either pease or barley. When barley is sown after wheat, it is scarcely possible in this kind of land to plow dry in the winter or spring seasons; and wet plowing renders the surface so tough or hard as to endanger the crop; and indeed it is observed, that barley is a precarious crop on wet clays, except when they are fallowed, and the barley sown upon the winter-furrow.

When barley is sown upon fallow, oats commonly succeed. The land being left open by the barley-crop, easily receives the water, and therefore, early in the winter is often in a situation improper for being plowed to advantage. After harvest, the land for barley must be fallowed, and the wheat seed made before the land for oats is plowed: and hence the wet clays are often too wet after a barley crop before they are plowed for oats, by which the crop is endangered.

When wheat is sown upon the fallow, the land after the crop is much firmer than when barley is sown, and by this means, it can much longer resist the rains; so that land plowed for oats after a crop of wheat, is in better order at the same season, than land plowed for oats after a crop of barley. And upon the situation of the land when it is plowed, depends in a great measure the goodness of the crop.

Upon

Upon rich wet clays, pease is a more certain crop than barley. But when this kind of soil is well reduced by a fallow, the pease crop, when introduced soon after it, becomes precarious. Although clay is capable of being pulverized very minutely, yet the particles to which a clay soil are reduced by fallowing, are larger than the particles of a loamy soil; and hence, by this operation, it is rendered opener, and its pores are made larger and more numerous. When dung is added to plowing, as is commonly done when this kind of land is fallowed, it is rendered still more open; and for this reason the pease-crop is the less precarious, the firmer that the land is made after the fallow, provided it is not too much exhausted. From these things it seems probable, that, on rich wet clays well reduced by a fallow, a crop of oats is not only a more certain crop after wheat than either pease or barley, but is in some measure even a preparation for the pease-crop that follows.

Barley very naturally succeeds the crop of pease; but if grass-seeds are not sown with the barley, it may be proper to take another crop of oats before the land is fallowed.

Of the Scheme in which Wheat, Barley and Pease, are sown without Oats.

Though the oats are very well adapted to the land of Scotland in general, yet, in some of our best lands they do not succeed so well as some of the other grains. When this is the case, they may be very properly kept out of the succession; and the crops in the order mentioned in the title, may follow each other in as many rotations as is proper for the land. The fallow may be very properly introduced immediately after the wheat, and either wheat or barley may be sown immediately after it. Which of the

two is most proper, the nature of the soil, and other circumstances, must determine.

When barley is sown upon the fallow, then the fallow may be regularly introduced every fourth year, and the same rotation constantly observed. But when wheat is sown on the fallow, then either more crops than three must be taken, or the order of the succession altered. When barley and pease follow the wheat, either another crop of wheat or another crop of barley must be added, as it is improper to fallow after a crop of pease, unless it is bad, and, in that case, as has already been directed, the pease ought to be plowed in. If it is improper to take more than three crops after the fallow, the order of succession ought to be changed; and instead of barley after the wheat, pease ought to be sown, after the pease barley, and so fallow again. In this scheme of throwing out the oats, it may perhaps be found proper to take four crops regularly, and to sow wheat and barley alternately on the fallow. On this plan, there are always two crops of the grain sown on the fallow, and one of each of the other two.

When the farmer proposes to keep his land for some time in tillage without fallowing, this scheme of throwing out the oats may be a very proper one for him to follow. And in this case, it may not be improper to enquire, in what manner the dung is to be applied? It has already been observed, that when wheat is followed by barley, oats, and pease, without fallow, there is no fixed crop for this; that, according to the situation of the land, it may be applied either to the wheat, the barley, or the pease. To what was mentioned on that head, I shall only add, that as weeds are more discouraged in this than in the other scheme, by the barley and pease crops returning more frequently, the dung may with greater success be applied to the wheat. As there are more plowings in this scheme
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than in the other, being as ten to nine, and as the oats, when a fourth crop, are severer than a fourth part of the other three, it may be expected, that, when the land is rich, it will be kept in better order by the scheme without oats, than by the scheme with them. But this need not be insisted upon, as it is improper in any case to continue land long in tillage, without fallowing.

Before this article is finished, it is necessary to observe, that this scheme of throwing out the oats, whether with or without a fallow, is not very favourable to the œconomy of the farm. When there is no fallow, there is little work in the summer; even when there is fallow, there is little in the winter; and often there will be a great hurry both in the autumn and spring.

Of the Scheme in which Barley, Oats, and Pease, are sown without Wheat.

A great part of our land in Scotland is improper for wheat, and yet many, from a natural partiality to what belongs to themselves, are inclined to sow wheat, though the sowing of some other grain less valuable, and at the same time less severe upon the land, would be more for their advantage. Land of this kind is sometimes fallowed with great care and at great expence, and wheat is sown. Perhaps the wheat-crop turns out tolerably well, which indulges the vanity of the possessor, and prevents him from observing, that, by his crop of wheat, his land is reduced almost to the same situation in which it was before the fallow. Whereas, had he sown barley or oats upon his fallow, though his crop perhaps would not have been quite so valuable, yet his land would have been left by the crop in much better order. I would therefore caution persons possessed of ordinary kind of land, against a fondness for sowing wheat, and advise them to content themselves with
the

other grains for which their land is better adapted, and from which they will reap a greater profit.

The fallow in this scheme is properly introduced, either immediately before the barley or the oats. If dung is to be laid upon the fallow, the sowing barley is the most proper; but if no dung is to be laid on, then oats are the most proper. When barley is sown upon the fallow, and the crops succeed as in the title of this head, then there must be more than one rotation. In this order of succession, when the barley is the first after the fallow, the pease are the last: And it is improper to stop there, as the land must be supposed still in very good order. If one other crop only is proposed to be taken, it may be either barley or oats: If two, first barley and then oats; and after the oats, the fallow is again naturally introduced. By this scheme the land is fallowed and dunged every seventh year. But although there are some farmers, that neither dung nor fallow oftener, yet this cannot be reckoned a good scheme of management. However, if they will not be prevailed upon to fallow oftener, they ought certainly to lay on a little dung, and this may very properly be done to the second crop of barley.

When the farmer is disposed to sow the grains mentioned without wheat, and at the same time fallow every fourth year, which is a scheme that must certainly turn out to advantage, then he must either sow oats upon the fallow, or alter the order of succession.

When oats are sown upon the fallow, pease and barley very naturally follow, and if a small quantity of dung could be regularly procured to the barley, this scheme would certainly be a means of keeping the land always in good order, and therefore a constant succession of good crops might be expected. Or in this case the order of succession may be altered; barley may be sown upon the fallow, and after the barley, pease, and oats. This form of succession

cannot be supposed to keep the land in so good order as the other, but then there is much less plowing, being in the proportion of five to seven.

By this scheme, particularly when barley is sown upon the fallow, and pease is the second crop, the land must be very loose and open at the time of sowing this crop, having the benefit of fallow and dung to the preceeding crop, and the former plowings perhaps not above nine months before. In this case, the proper way is to sow the pease upon the stubble, and plow them in, except the land is naturally very stiff. By this, as was observed, when treating of the culture of pease, the seed will be laid upon a firmer soil, and in less danger of being hurt by rain, either immediately after sowing, or in summer.

Of the Schemes in which the sowing or planting of Roots or Greens is introduced.

In farms where there are cattle or sheep the providing food for fattening these in the winter season, or even for maintaining them, is important. This is done by the sowing or planting of roots or greens. The chief of these are the turnip or potatoe: At least, these can only be introduced with advantage into a general scheme of management. The different kinds of cole may indeed be used; but the turnip is preferable: It serves the same purposes of food to sheep or cattle, and a larger crop may be expected. But what is of greater consequence, is, that the turnip is not so early sown, and therefore allows the land to be much better prepared.

The manner, in which a crop of turnip ought to be introduced, depends upon the value of the crop of turnip, compared with the value of the other crops. The crop of turnip is so valuable in some parts of England, that the farmer is tempted sometimes to over-turnip his fields, and to sow a second, and sometimes a third crop, without any other kind of crop interveening. If a crop of turnip was
as

as valuable in Scotland, it would deserve a very particular attention. This, however, is not the case ; turnips are not so valuable in Scotland as in England, ; and this is not altogether owing to our being unacquainted with their uses and qualities, (though this too is partly the cause) but from this, that there is a less demand for butcher meat in the winter-season. This demand, however, in Scotland, is daily increasing, and, in consequence of it, we may expect, that the value of a crop of turnip will daily increase likewise. In some places, it is already of such a value, as to entitle it to the attention of the farmer, at least to the attention of every one that is not far from the butcher-market.

The great objection of the farmer to the sowing of turnips, is the great culture which they require. This makes it difficult for the ordinary servants upon a farm, to manage any quantity worthy of attention. In the neighbourhood of villages this defect can easily be supplied. Perhaps, if the farmer was once acquainted with the most proper œconomy in the culture of this crop, he would find the labour much less than what it appears to be.

In Scotland, the ordinary way of introducing a crop of turnips, is by sowing them upon the fallow. In this case, the fallow receives the first plowing early in the spring : After the barley seed is over, the land, by frequent plowings and harrowings, is reduced as much to a powder as possible before the first of July, the time of sowing the turnips. By this means the land, though it carries a crop, receives a tolerable fallowing ; and the weeds that spring after the turnip is sown, are destroyed by the hoe.

When turnip is sown upon fallow, barley must succeed, for the turnips remain in the ground till the season for sowing the other grains is past ; but this is no disadvantage, as the sowing of barley upon the fallow is, in many cases, as advantageous as the sowing of wheat ; and besides

sides it is observed, that a good crop of barley, unless some unfavourable circumstances interveene, is certain, after a crop of turnip fed by sheep upon the field.

In this scheme there is a crop every year ; But as a crop of turnip is far from being so severe on the land as a crop of any kind of corn ; and as the culture given to this crop is nearly equal to a fallow, the land must be kept in better order by this scheme, than by those in which there are the same crops of corn without fallow.

To bring the turnip crop still nearer to a fallow, some persons sow them in rows about three feet and a half or four feet distant from each other, and horse-hoe betwixt the rows. By this the land is oftener plowed, and it lies in a proper situation through the winter, as the number and depth of the furrows give an easy passage to the water : Besides, there is less hand-labour, and the crop can be taken off more easily, and with less hurt to the land. No part of the field is hand hoed except the rows, and after the first hoeing few weeds appear : And instead of poaching the land in a very wet season, by the cattle going upon it in carrying off the turnip which must be done, or they must be carried by men at much greater expence, a horse with creels can go in the furrow betwixt the rows, and receive the turnip from each side, without doing the smallest hurt.

But though the turnip crop should be horse-hoed, yet it cannot prepare the land so well as a compleat fallow ; and therefore the introducing a turnip-crop in place of the fallow, however advantageous it may be at first, must in the end prove hurtful. When this practice then is followed, it seems requisite to take fewer crops of corn, and thereby make the turnip crop to return oftener ; or, if the demand for turnips does not allow this, to introduce a hay-crop in their place. Thus, if it is proposed to take three crops of corn, after the turnip, may follow very properly barley, pease

pease and wheat ; and if only two, barley and oats. In these cases, when there are only two or three crops of corn taken, if there is not a sufficient demand for turnips, to allow a crop of them once in the three or four years, a crop of hay may be introduced in its place, and a succession of the same and other crops may follow.

The potatoe is the other root, a crop of which is introduced into a scheme of management. The culture of the potatoe is very different from that of the turnip ; it is planted much earlier in the season, and taken up much sooner. It is planted in March or April, and taken up in September or October. It requires as much, if not more, culture than the turnip ; it takes much more labour to plant and take it up. This must prevent the potatoes from being very frequent, except in the neighbourhood of a town, or villages. However, even in places where extraordinary hands cannot be got, it is very proper to plant a few ; for as there is a certain market for them, and as they are very proper for feeding cattle, they generally turn out a very advantageous crop to the farmer.

But though the crop itself turns out more advantageous to the farmer than a crop of turnips, yet it cannot be introduced into a general scheme of management, with so much advantage to the scheme. It is not so proper to be introduced in the place of a fallow. The early planting prevents all the benefit that arises from the plowings given to the turnip land before the seed is sown ; and the manner of taking up the potatoes obliges the land to be left in a situation very unfit for the winter, unless the expence of another plowing is added ; and after the potatoes are taken up, it is rather too late to sow wheat, unless the season is favourable. The disadvantages of a crop of potatoes in a general scheme, are not so great when they are planted in rows, at such distance as to allow horse-hoeing. By this means

means the land gets a kind of fallowing ; but it is evident, that the plowings in horse-hoeing being much confined, cannot answer all the purposes of plowing, so much as those given the fallow, which can be done in the most proper manner. If therefore a crop of potatoes is to be introduced into a scheme of management, it is very improper to make it serve in place of a fallow. Unless a crop of potatoes is horse-hoed ; it may be reckoned severer than a crop of pease, and nearly as severe as a crop of barley. There is a great deceit in the first trials of potatoes with regard to this. If the land on which they are planted is much infested with weeds, the destruction of these weeds occasioned by the frequent hoeings given to the potatoes, prepares the land for a crop of barley ; and hence a crop of potatoes is falsely reckoned beneficial to land. But let the land be properly cleaned, and then the hoeings given the potatoes not being so beneficial, it will soon be discovered, that a crop of them is as hurtful as a crop of hoed-barley, and much more hurtful than a crop of hoed-pease. It is proper to compare them with hoed-crops themselves as they are hoed, and as the land that carries them receives some benefit from this operation.

But though a crop of potatoes cannot properly be introduced in the place of a fallow, yet it may be introduced into those schemes in which fallowing is not thought necessary, or in the other schemes along with a fallow. Thus when wheat is succeeded by barley, oats and pease, or by barley and pease, without a fallow, the crop of potatoes is very properly introduced betwixt the wheat and barley. When barley is succeeded by oats and pease, it may be introduced betwixt the barley and oats. Betwixt the same two crops it may be introduced when barley is sown upon the fallow, and fallowed by oats, pease and wheat.

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The introducing potatoes into those schemes where there is no fallow is particularly advantageous. This kind of land; from the constant cropping, and frequent dunging, cannot be clean. The laying dung upon land that is foul, endangers the crop that immediately follows, and if the crop is not hurt, occasions a very great increase of weeds. This is prevented by laying on the dung to the potatoe-crop; for this crop always receives benefit from dung; and the encouragement that dung gives to the growth of weeds in this case, tends to their destruction. Even when the land is fallowed for barley, if a crop of potatoes is to be introduced betwixt the barley and oats, it will probably be found to be the best method not to lay the dung upon the fallow, but before planting the potatoes. If the land is naturally good, the fallowing will produce a good crop of barley; and the hoeing the potatoes, after the dung is laid on, will greatly discourage the growth of weeds, and secure better crops of the other kinds of grain that follow in the rotation. What has been said with respect to the laying on the dung to the potatoes, may be applied likewise to the turnip. When a crop of turnip is introduced in the place of the fallow, it is always supposed that they are to be dunged; but even when both a crop of turnip, and a compleat fallow, are introduced into the same scheme, it may be found often the most proper method to sow oats upon the fallow without dung, and to apply the dung to the turnip-crop that follows. This is a more proper way to discourage the growth of weeds, than laying the dung upon the fallow.

ARTICLE

ARTICLE. LXXIII.

ABRIDGEMENT OF HUSBANDRY
ANATOMISED: By JAMES DONALDSON.

[Continued from our last, p. 578.]

CHAP. VI.

Concerning Planting of Trees.

I Recommended planting trees for shelter, as a great mean to enrich the ground; and the planting of fruit trees, as very beneficial in respect of their fruit. Much has been written on these subjects, better than I can pretend to do. What I intend, is, only to give the husbandman, who has not opportunity of seeing these books, a short hint of what he may do in this matter, without much expence or trouble, as a day's labour or two, of one man in the year, will bring up a greater nursery than he will need.

Dress a little bit of the garden, and thereon sow the seeds of such trees as you wish to have; suffer not any weeds to grow amongst them. If the plants shall rise closer than they can well grow together in the nursery, transplant them to another place; so that while they remain in the seed-bed or nursery, they may be about a foot or eight inches distant. If you raise but two or three hundred every year, you will soon plant all your hedges; and when they are about six or eight years old, they may be transplanted about the borders of your fields.

Fruit trees may as easily be brought up from the seed as the barren trees: But when they are about an inch thick in the stem, they must be ingrafted; which is done thus, with a sharp knife, Cut the stock of the tree about a foot and a half from the ground; after making it very smooth,

smooth, slit it down a little to receive the graff. The graffs should be handsome twigs of one year's growth, taken from the best fruit trees you can get, cutting off the top, leaving it about six inches long, and containing two or three eyes or joints, let an inch and an half, or thereby, remain under the lowest joint of the twig; which you make in form of a wedge, letting the bark or rind remain upon the edge of it: then put it into the slit in the stock, joining the rind of the graff exactly with the rind or bark of the stock: Wrap a piece of clay round the place, where they are joined to defend it from the rain, till the wound close, and they are united, tying it with some bafs to keep it on.

Fruit trees should be planted out at about thirty foot distance at least; and if the ground is cold, dig a hole two or three foot deep, and six or eight foot broad, fill it with good earth, mixed up with old rotten dung, and therein plant your tree; for when the roots of a tree are placed upon cold till or clay, it cannot thrive. And if the same rule was observed in planting the barren trees, or the ground was to be dunged, where hedges are to be planted, they would come much quicker forward.

C H A P. VII.

Of sowing and planting Garden Seeds and Roots.

I have recommended the use of garden roots and herbs as more profitable to farmers, than always to make use of grain for the maintenance of their families: I have endeavoured to shew, that any kind of ground may be made fertile by industry. Now, by fencing the garden from storms, by hedging and planting, and by dunging it well, they may have roots and herbs in abundance. The ground should be fully trenched about Hallowday; and after lying rough all winter, it should be dunged and delved once

or twice in the spring, till it is brought to a proper condition for sowing different kinds of garden seeds, and planting potatoes, kale, and cabbages. By this means, from the middle of August he may have potatoes; from March he will be supplied with leeks and parsnips; from May to October, kale, cabbages, carrots and turnips; and onions all the year round*.

C H A P. VIII.

Several Objections answered.

Objection I. It may be asked, If such benefit is to be reaped from the methods I have advised, why are they so universally contemned and neglected in the country?

This may be ascribed to three several causes; two of which may be remedied by the landlords; the third belongs to the tenants themselves to remedy. 1. When a tenant makes any remarkable improvement on his farm, the avarice of the landlord is awakened, and he obliges the tenant either to pay a higher rent, or to remove; in so much, that it is become a proverb, and none more true, *Bouch and Sit, Improve and Flit*. And I doubt not, that if tenants had certain security for continuing in possession, they would thereby be much encouraged to improve them. 2dly, Another cause, why farmers make so little improvement on their lands, is, poverty, that great enemy to virtue and

* The greatest part of this Chapter is taken up with Directions for raising potatoes. As that root was but little known in our Author's time, and propagated only in gardens, his directions are very imperfect, and are only for raising them in the lazy bed: which it was needless to take down, as much better and more improved methods are now generally known, and applied to raising them and turnips both in the open fields.

and industry; for people that are empty handed, are glad to accept of any thing that first offers, rather than wait for greater things in futurity. In this case, where landlords have a well disposed tenant, they might give him encouragement, by a less rigorous exaction of his rent, till his improvements begin to yield him some profit. But, 3dly, The chief and principal cause is, want of skill in the tenants, to forecast and calculate the ordering of their business; most of them, thinking it better to take a scanty crop of corn, rather than leave their land in grass; not considering, that, by leaving a more considerable part of their land in grass, the rest that is manured is much more enriched by getting a greater allowance of dung; and at the same time, the part that is left in grass, is thereby brought into a more fertile condition. But I have already so fully shown the profits of dividing farms properly, and taking only so much into manures, as can be kept in a good and sufficient condition, that I need say no more on that point. And shall only intreat our farmers, to apply, in a literal sense, the two parables of our Saviour, “Of a King’s going to make war, and a man’s beginning to build;” for whoever undertakes a business, that is above his power to accomplish, ten to one but his project miscarries.

Objection II. Though the methods proposed shall be followed, the profits will not be so high as are stated: For, in chap. iii. you have reckoned all things at a disadvantage in the first example; and to the advantage in the second.

The contrary of this is true; for in the division of croft and outfield, the croft in the second instance gets more than double the allowance of dung it gets in the first; and the differences of product is stated only at three bolls per acre,

acre, which cannot be reckoned extraordinary. Nevertheless admit, that the difference shall be only two bolls, that is, let us suppose, that according to the first way of manuring, the croft shall produce five bolls *per* acre, the odds will be greater than I reckoned it, if you cut off the additional rent of £. 150 I allow for the second farm, more than was supposed for the first. But besides, there were six bolls of seed, and four of horse corn saved, which were not reckoned in that account. I think I have given satisfying reasons, why in the latter case, the outfield may be supposed to yield a boll more *per* acre than in the first. And the profits stated on the Cattle, I think none can doubt of.

Objection III. Hedges will not grow on any barren ground; and if they should, they afford little shelter to the ground, beyond the breadth of a ridge or two.

I have already shown, that any ground by industry may be rendered fertile, and so fitted for rearing hedges. But to be more particular, when you intend to plant a hedge, and have marked off the line of the ditch, take the surface earth of the ditch, and throw it up on the dyke, and on it plant the hedge, and cover it with the remaining earth of the ditch. If the ground is very barren and cold, mix dung with it before you plant the quicks; for as I observed with respect to trees, if the roots are planted in a cold clay or till, they seldom thrive: It is the same with thorns: Whereas being planted in the surface earth, which is always richer and warmer than what is below, and especially if enriched by dung or lime, they will thrive exceedingly. In order to preserve the hedge while young, if the fields next them are kept in corn, the beasts will have no access to them in summer; and in winter, the cattle seeing nothing to tempt them to break into the inclosed fields,

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the hedge and the ditch will be sufficient to restrain them.

As to the shelter afforded by hedges, it is much greater than the common farmers will admit. If the inclosures are not too large, and the hedges are come to any maturity, the whole inclosure will receive benefit from them, and the cattle will have shelter from the storm, whatever point it blows from. But it must be remembered, that I also recommended the planting of trees in the hedges, which in time will afford very great shelter.

Another great benefit arising from inclosing, not formerly mentioned, is, that the cattle have access only to such fields as the farmer pleases, whereby the ground is preserved from being poached, and the sward broke by their feet, by which the ground is chilled by the water standing in their footsteps.

And here it may be observed, that although water standing in the footsteps of cattle moisteneth the ground too much and chilleth it, yet watering of grass grounds is a very great improvement, and ought not to be omitted, where there is a command of water. It is performed in this manner; when you can bring water into a ditch along the head of your field, make a little gap or opening upon the head of every ridge, that you may open or close at pleasure; from these draw furrows with the plough or spade, squintways in the declining of the hill, from the furrow between the ridges, to the top or middle of the ridge where it is left without any conduit, and it spreads and waters the ground. When it falleth down into the furrow, it is to be raised up to the middle of the ridge as before; and so renew the conduits, till it come to the lowest part of the field.

Objection

Objection IV. You recommend the housing of sheep; whereas it is hardly possible to build huts for so great a number of sheep: and to take part of their pasture ground into manure, which is impracticable, for the land is so mountainous, that it cannot be plowed.

I answer, that where the land is mountainous and cannot be plowed, lay the dung of the cattle upon the grass, which will greatly improve it. But there are few farms so mountainous, but part of it may be made arable.

And as to building the huts, the profit of their dung, will much more than ten times recompence the trouble: The expence of tar and butter used in smearing the sheep for one year, will build them huts that will last for ten years. And besides, not only the sheep are thereby kept in a better condition, but their wool is greatly improved.

Objection V. The benefit of sheeps dung by keeping them in huts is nought: for however much the ground on which it is laid may be bettered, the pastures on which they fed must be so much the worse: for, when the sheep lye in the fields, the pasture is enriched by the dung, which is spread equally over it.

There is some seeming reason in this objection; but upon examination it flies off. When the dung gets leave to lye above ground, not only much of its strength is diffused into the air, and exhaled by the sun's heat; and being scattered up and down in very small quantitys, the salt that is in it cannot overcome the natural coldness of the earth. If a piece of red hot iron, that would warm one pint of water, is put into a body of twenty or thirty pints, the iron would be soon cooled, and the water be little or nothing the warmer: In like manner, this quantity of dung, that is sufficient to warm and enrich thirty acres of land yearly, being

being scattered up and down a thousand acres, the effects of it will never be known

Objection VI. You advise to dung the pastures where the ground is not arable; but the grass in that case will rott the sheep.

In answer to this, I advised to make hay of it the first year; for there is no ground that bears grass, but it may be made so fertile, as to make the grass grow long enough for hay: But if it should not, yet it may be fed for the first or second year, with other cattle, or with the sheep intended to be fattened and sold.

Objection VII. Your orchards and bee-hyves are for gentlemen to look after; we have not time for such conceits; we must be taken up about some other business.

I have shown, that there is profit, as well as pleasure, arising from these. The orchard is in effect a hay park; and besides the profit from the fruit of the trees, you will have as much profit from the ground, as from any part of the farm. The bees require but little pains or expence; there is no situation so barren, but will afford them food; and the profit in honey and wax may be very considerable.

ARTICLE

ARTICLE. LXXIV.

An account of the Produce of the POTATOES, named The ROYAL FORRESTER, and RED NOSED KIDNEY; mentioned in page 187.

To the EDITOR of the SCOTS FARMER.

SIR,

I Write this to acquaint you, that I planted the dozen of ROYAL FORRESTER POTATOES, and the like quantity of RED NOSED KIDNEY POTATOES, you sent me; each in half a fall of garden ground without dung, and have, in return, about a firlof of each kind. The RED NOSED are the largest in general, and filled the firlof rather a little higher than the other; but even the ROYAL FORRESTER filled it so well, that I am persuaded it would not have held above one half dozen of middling Potatoes. I also planted two dozen of another kind of Potatoes, in about the same quantity of contiguous ground, and had not above three pecks in return. The seed of these last was not quite so large as that of the ROYAL FORRESTER and RED NOSED KIDNEY, and they are in general rather smaller than either, and yet not ill sized. I have only to add, that the different species are hardly to be distinguished, there being many of the RED NOSED KIDNLY, round like the FORRESTER, and of the FORRESTER, flat like the KIDNEY. The third kind of Potatoes, were something like the SPANISH GRAY.

Edinburgh, I am,
November 8th, 1774.

SIR,

your most humble Servant,

A — D —



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